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This handbook contains units to be used by the resource teacher in workshop groups for children of high academic ability or with special interest in particular topics. Some of the units are an extension of the work in the grade level handbook, other units were designed to broaden horizons by introducing new areas of emphasis.

The handbook for intermediate grades provides both continuity and new dimensions through exploration of a few large units of study to encourage both breadth and depth in learning. The major areas covered are: language arts, the fine arts, biographies of famous men, island civilizations, archaeology, oceanography and special units in mathematics.

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Foreword

This handbook planned for the use of resource teachers, contains units which have been developed by individual resource teachers for the purpose of using these with workshop groups. The workshop groups usually include children having high academic ability or who have special interests in particular topics. Some of the units have been tried with groups of children, others have been developed during the summer workshop and have not been tried in a classroom situation. Some of the units are an extension of the work in the grade level handbooks, other units were designed to broaden horizons by introducing new areas of emphasis. In both types of units there has been an attempt on the part of the writing group to develop the study in such a way that it will extend the work beyond that which has been done in the grade level handbooks.

Evelyn Piper
Evelyn Piper
Director of Elementary Education

Issued by School District No. 4, Lane County
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Millard Z. Pond, Superintendent
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Eugene, Oregon, 1963

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Deputy Superintendent

RESOURCE TEACHER HANDBOOK

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PHILOSOPHY OF EDUCATION

The District 4 School Board believes that schools have been established and maintained by the State for the education of the individual and the improvement of society. It believes that each individual should be accepted into the educational program as he is; that he shall be provided with a stimulating environment and opportunities for learning experiences designed to assist him in realizing his maximum mental, physical, emotional, and social development.

In addition to assisting him in attaining these objectives, the board believes that it is the obligation of the school to make every possible effort to develop in each individual a zeal for continuous learning and self-improvement.[1]

INTRODUCTION

This handbook is a revision of the resource teachers' handbook, A Tentative Guide for Resource Teachers Working With Educationally Able Children, which was written during a summer workshop in 1960. It reflects the experience of teachers in using the previous edition and incorporates the many suggestions made by them.

The handbook is intended to be a source book rather than a course of study. It provides direction and continuity in the instructional program, yet encourages each teacher to exercise initiative and originality in meeting the needs of children. To encourage both breadth of knowledge and depth in learning, both continuity and new dimension are provided through the exploration of a few large units of study throughout the intermediate grades. Each year's study makes a contribution toward a greater depth of understanding, development of attitudes, and stronger habits and skills.

Sequence and integration of experiences are provided in the following units:

- Archaeology
  - Oregon Before the White Man
  - Introduction to Archaeology and Archaeology of the United States
  - Archaeology of Latin America
- Oceanography
  - Origin of the Ocean; Surface Features of the Ocean; Under Water; Waves, Tides and Currents of the Ocean; Content of the Ocean; The Evolution of Oceanography

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[1] School Board Policy Statement, School District No. 4, Lane County, 1961.

- Language Arts
    - Our Language
        - Signs, Symbols, and Codes
        - People, Places, and Things
        - Keys of Meaning
- Social Studies
    - A World Approach to History Through the Biographies of Famous Men
        - World of Abraham Lincoln
        - World of George Washington
        - World of Leonardo da Vinci
    - Planning an Island Civilization
- The Arts: Art, Music, Literature
    - The Arts and the Oregon Pioneers
    - The Character of Early American Culture
    - Latin American and North American Culture: Contrasts and Similarities
- Literature
    - Mythology
    - Biographies
    - Great Books

Since approximately one-half of the time of the resource teacher is directed toward improved learning experiences for able and interested groups, an attempt has been made to suggest a variety of appropriate activities in addition to the units listed above. The ideas are presented in several different forms: resource units, unit outlines, suggested learning activities, bibliographies, and examples of children's work. Key references and suggested activities are often included with the unit outline, and in some instances a complete resource unit is available upon request, a unit based upon the unit outline. Generally the suggested learning activities contain the purpose, approach, plan for development, and key references.

Throughout the handbook asterisks are used in the bibliographies to indicate which books are available in the Resource Library.

The rewriting of this handbook was done by Edna DeHaven, Dorothy de Veau, Jeanette Eckenrode, and Opal Woodson with the assistance of Vera Moomaw, coordinator for the educationally able.

Vera Moomaw

Vera Moomaw
Coordinator, Educationally Able

Language Arts

- Creative Writing
- Poetry
- Great Books
- Biographies
- Our Language
    - Signs, Symbols, and Codes
    - People, Places, and Things
    - Keys of Meaning
    - The Story of Our Language
- An Inductive Approach to Sentence Structure
- Literature: A Selected Bibliography
    - General
    - Biography
    - American Folklore
    - Indian Myths and Legends
    - Latin American Folklore
    - Myths and Legends
    - Personal Accounts

CREATIVE WRITING

TECHNIQUES FOR STIMULATING CREATIVE WRITING

The following are a few suggestions that this writer has found most valuable in helping children to write creatively. There are many techniques and approaches. This list is not intended to become a set of rules but rather an opinion.

1. The teacher sets the stage for creativity. Her attitude conveys acceptance and respect for each child, his original ideas, and ways of expressing himself.

2. No matter how crude the product may be, if it is an honest statement of the child, it is far superior to that which is copied and influenced by an adult.

3. Writing provides an outlet for his inner feelings and a release for tensions.

4. Ideas are more important than correct usage and spelling at first. Form, correctness of spelling, and good usage, may be examined in the final writing to ascertain the standards for an acceptable copy. Standards and guidance are never forsaken.

5. As creativity develops, a person sees the world in ever-new and fresh ways.

6. One of the traits most frequently found in the able and advanced student is a superior vocabulary. In order to enrich this factor, a knowledge of how to use the dictionary and a thesaurus helps to facilitate expression.

7. A child must have a real purpose for writing.

8. The use of literature and recordings as sources of good description is effective. Films, pictures, and drawings can also be used to increase motivation.

9. Sometimes reading a poem or a story two or even three times aloud sets moods or builds interest.

10. There should be an opportunity provided for every child to share with others what he has written, if he wishes.

SUGGESTIONS FOR GUIDING CHILDREN IN CREATIVE WRITING

The following are some typical examples of the different types of creative writing that we have used.

1. Writing Stories

These children are capable of appreciating great suspense. The teacher wrote the beginning of the story and then each child finished it in his own manner. They included at least one problem in their story...someone or something working against the hero or heroine. This creates a problem to be solved.

2. Original Letters

We scanned the newspaper for articles in which there was a problem indicated and wrote letters to the person involved offering our suggestions for solving the problem. One such letter was to a seventeen year old boy that was expelled by the school board because he refused to cut his "duck tail"-styled hair.

3. Written Interviews

The fifth grade students interviewed three different people to get an opinion on "What Democracy Means to Me." An excellent opportunity for this type of writing came during their study of George Washington's World.

4. Autobiographies or Biographies

In preparation for writing the above, and also to create an interest in reading, each child first selected a career that he thought he might pursue as an adult and compiled a list of leaders in this field. From that list the children selected five leaders and completed some rather intensive research on these people and discussed in a "round table" situation some interesting phases of their lives and their contributions. This seemed to generate enthusiasm for writing their own biographies. Techniques for outlining were reviewed and an outline prepared to organize their thoughts. This outlined birthdate, place, family members, pets, outstanding event in my life, what I hope to be when I grow up, etc. Each child had the choice of doing his own life story, or giving this outline to a friend and letting the friend do the story. Each such story was bound with covers designed like the "Life" magazine with the child's silhouette portrait on the front.

5. Diaries

The children were asked to imagine:
You are crossing the plains in your covered wagon on your way to Oregon. Suddenly you come upon an old prospector and his burro. As you approach him you notice he is writing in an old leather-bound book....What has he written?

6. Taking Notes

Take notes from group discussions, reports, panel discussions, and other informative presentations.

7. Writing Social Notes

Write "thank you" notes to a guest speaker as a way of showing appreciation for his coming to speak.

8. Writing Family Histories

As a special interest project, one of the sixth grade students wrote her family history. She also had access to her family tree.

Every community possesses source materials for the preparation of its own history. The academically talented students might try "their hand" at writing original history.

9. Dramatic and Puppet Plays

10. Writing Evaluation of Television or Radio Programs

11. Book Reports

    Pretend you are the author of the book and write your reason for writing the book.

    You are a newspaper reporter called upon to write a review of the book for the Sunday edition of your newspaper.

12. Writing one of your family stories which has been "kept alive" be being passed from generation to generation.

13. Write tall tales about fictious characters or about how one of the natural features of your community came about. See "The Lost Ribbon", a tall tale about how the Willamette River here in Eugene happened to be, and "Gus Greenthumb."

14. Writing poetry, original words for music, descriptions "My Father" etc.

15. News reports, editorials, etc. for school or class newspaper.

16. A father of one of the children, who is an author and has actually had many things published, came to speak to the class. The children asked many interesting questions, such as:

    > What should I be doing right now to prepare for a career as an author?
    >
    > How did you get started? When did you realize that you wanted to write?
    >
    > Tell us about finding a market for your work. Is this hard?

17. Suppose you had to write the directions for a game for second graders and the directions for this game had never been written before.

18. We called this idea "Fun and Fantasy." The children imagined a fantasy land. It could be just as queer, wonderful, and fantastic as the child wished it to become. They first plotted a map of this land and then made a three-dimensional model using any type of material that they needed.

    A story or a poem was then written to describe this land which they had created.

19. Literary Magazine, an interest-group project.

    A group of fifth graders were very interested in pursuing a project in creative writing and wanted to publish a magazine of their own.

    A committee of nine youngsters from the three fifth grades met and had an opportunity to study and examine many children's magazines before they ever attempted to write any standards. After much discussion the following standards were written.

I. Variety of materials
  A. Poems and Limericks
  B. Short stories
  C. Jokes (a few) . . An occasional riddle or puzzle
  D. Contributions from other rooms
  E. Book reviews . . . Book riddles
  F. Interviews . . . . (People new to the school, visitors, etc.)

II. Balance of realistic happenings as well as fictional happenings.

III. We should try to provide a change of pace each time a publication is issued in order to hold the interest of the readers.

IV. Material must be well written. Papers should be easy for the person typing the stencil to read. Watch correct spelling and proper usage.

V. Appearance of issue
  A. Attractive cover
  B. Interesting title for the magazine

VI. Credit should be given to all authors of material.

These standards were mimeographed for each room and the committee discussed the list with other members of their class. This close relationship helped stimulate and motivate interest among all the fifth graders.

It was explained that whenever an exceptionally fine piece of writing occurred and could meet the standards, it was to be handed to a committee member. At the end of one month the committee again met with the resource teacher and they began to make selections according to the standards. The standards were very high and everyone seemed highly pleased and were proud of their efforts.

The Dedication is indicative of the children's attitude toward their magazine.

> This Literary Magazine of creativeness, of knowledge and skills, of fun and enjoyment, is hereby dedicated to all the boys and girls of Edison School who are interested in, enjoy, and work to further the cause of good writing.

Covers for the magazine were made during art classes and a contest was conducted to select the most appropriate cover. Each student received a copy of the magazine whether he had contributed or not.

By the Associated Press
Atlanta

The Georgia Board of Education says a high school pupil must do away with his ducktail style haircut if he wants his diploma.

The board voted 7-1 to uphold a country school board which supported a high school principal in suspending Stanley Sorrells, 19, from school.

After the board's decision, Stanley's father, Walter C. Sorrells, said, "This is not American."

Mr. Sorrell's attorney, John P. Nixon, asked the board:

"Do we in Georgia have the right to dictate how a man shall fix his hair so long as it does not offend public morality? If a school principal can say how hair should be worn he can say what kind of pants a man must wear and what color of shoes.

The board majority took the position that maintaining discipline and the right of the county boards to run the schools was the issue--not the ducktails.

Stanley was readmitted to classes three weeks after his suspension last October under a compromise requiring him to comb his hair in a different style.

We scanned the newspapers or magazines for news items in which there seemed to be a particular problem indicated and the children wrote original letters offering their solutions to the problem.

2160 Onyx
Eugene, Oregon
April 2, 1962

Dear Stanley,

I understand your predicament! I think you should probably be able to wear your hair anyway that you want to, but as the Georgia School Board says, "Its not your hair so much as it is how you behaved when they asked you to cut it off." When we refuse to obey the rules of our city and schools we sometimes end up in front of a juvenile court.

"I don't think your hair really looks good combed that way. Why don't you cut it off, Stanley?"

Yours truly,
Denise

P.S. I am enclosing the latest book of haircuts. I am sure you will enjoy looking through this, and also hope it will serve to help you out of your trouble.

- - Denise, Grade 5

LIFE

THEY CALLED ME TROUBLE

Me, I'm a problem child.

It all started when my brother Dan got the measles and my Mother was rushed to the hospital. This all happened on March 22, 1949, when I was born.

Nobody thought, of course, that I was going to be a problem child. I was a girl, a sweet little brown-eyed girl, and everyone knows how nice little girls are. Boy! somebody sure goofed. It didn't show up so much until the terrible two's. Of course I would not go to sleep at night until everyone else did and I insisted on sleeping in until nine every morning, with absolute quiet. By the time I had reached two, it was terrible for everyone concerned. I learned to walk in a stroller, because the house was big and old and cold. So to keep me out of harm's way, my grandmother put me in a stroller. Consequently, I skipped the squirmy, crawly stage.

As soon as I could sit up they popped me into a stroller without any handles and I went bouncing off the walls. My stroller had bumpers and I took a great delight in running lickety split at a wall and bouncing off it. Somebody coming into the room might have thought I had a screw loose and I might have at that, from bouncing off so many walls. We had a cat but a little of me went a long way because by the end of the second year he ran away and we never heard from him again. He was a real nice cat, a blue Persian, and my grandmother had had him for a long time.

I have only one more incident about my early childhood that I would like to mention. It was when my picture was on "The Ladies Home Journal". I really wasn't on it, but there was a picture of a little girl in a sun suit eating an icecream cone and sitting in a stroller, that looked exactly like me. My mother dressed me in a sun suit, bought me an ice cream cone and took my picture in the stroller, and sure enough there was a striking resemblance.

As I grew up I became harder to handle. That's when I got the nickname "Trouble". You see, I ran away. Always and continually. We had a big back yard, a big front yard, two great big trees in each of the two side yards, and there was even a swing in each tree. Was I happy there? Oh! no, I had to cross streets, go around blocks, be anywhere but where I was supposed to be. To make matters worse, Consolidated Freightways trucks came up the street on one side of the house (I waved to the drivers while sitting on the curb) and the Oregon Electric tracks went along the street in the front of the house. (I flirted with the engineers).

When I was four my family decided that they had had enough of trying to keep me out of trouble on the west side of town so we moved to the east side, to kind of even things up for the City of Eugene.

I went to Christian Kindergarten when I was three and four, in the hopes that I would become a little civilized. I had lots of fun, probably because the rest of the kids were "brats" too.

When I was five my mother gave a sigh of relief. The kindergarten system in Eugene made it possible to turn me over to the public school authorities. She probably thought they had had more experience in dealing with characters like me. Besides she worked all day and she was tired. My grandmother and my grandfather were tired too.

I eventually got into the first grade and advanced to the fourth with a minimum of trips to the office to talk to Mr. ____ about why I had done this, and why I had done that. In the fourth grade, disaster struck. I like to play baseball and was in the field during a school baseball game. I caught a hard fly, but none too well. I broke the little finger of the left hand. My mother was very glad that I was insured. One nice thing about it was that the finger did not heal straight and I got out of the music lessons I disliked so much.

About that time I started taking swimming lessons in the summer, in the second year of the lessons the swimming coach pulled me out of the water one day and put me on the team. I didn't win anything but had lots of fun and saw much of Oregon.

I have purposely left my big brother out of this. He can write his own story. After all, he is seventeen and ought to be able to write. We get along no better and no worse than any other brother and sister, my mother keeps telling herself. Of course the time we had the water fight while we were doing the dishes and she was ironing in the basement right below us was really nothing. Water just seeped through the floor onto her ironing board. I didn't know she could come up the stairs that fast and I'll never know where she found that stick. She's kind of brave, my mother. I am as tall as she is, and my brother is 6 feet and 2 inches. We've never had another water fight when she was in the house.

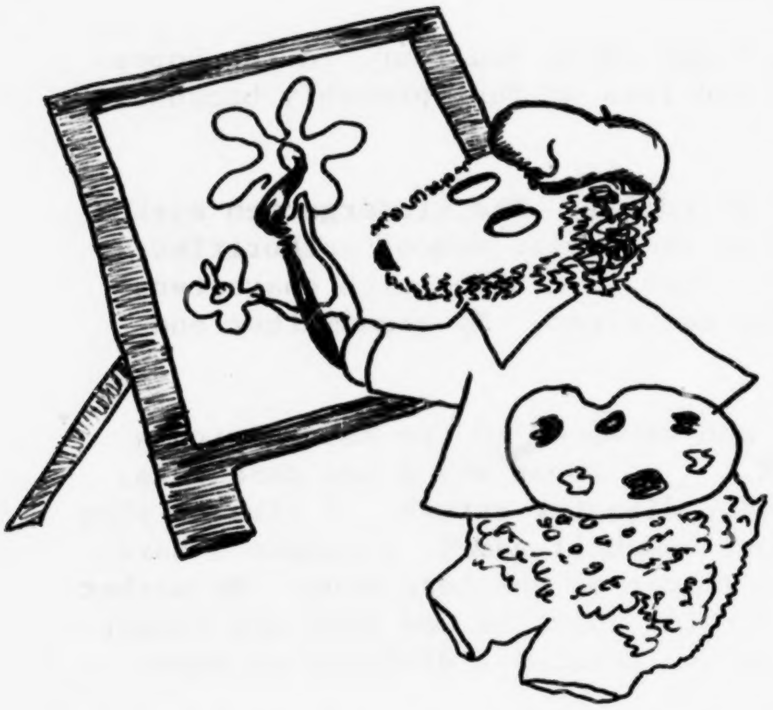
When I celebrate my 12th birthday, my kitten "Mittens" will be two days over a year old. I brought him home, a gift from a friend, and kept him hidden in my room for almost three days. He escaped my mother's eagle eye the first two nights but the third night she came in to kiss me good night and almost went through the roof when a tiny little kitten raised its head from my pillow and said, "Meow". My mother named him "Mittens" and now even my grandfather likes him.

I shall have to end this story on a sad note. Nobody in two generations of my family ever broke anything until I came along. Now I have my second break. This also happened at school. Maybe my mother won't send me to school anymore. It is dangerous. In physical education class I came down wrong on my foot and broke a bone. Now I am on crutches.

I would like to end by saying that I was very proud to work in this class with Miss _____ as my teacher. I like it very much.

My plans for the future are to not be a "problem child" anymore and to study hard so that some day I can become a teacher.

Pierre, The Talking Dog

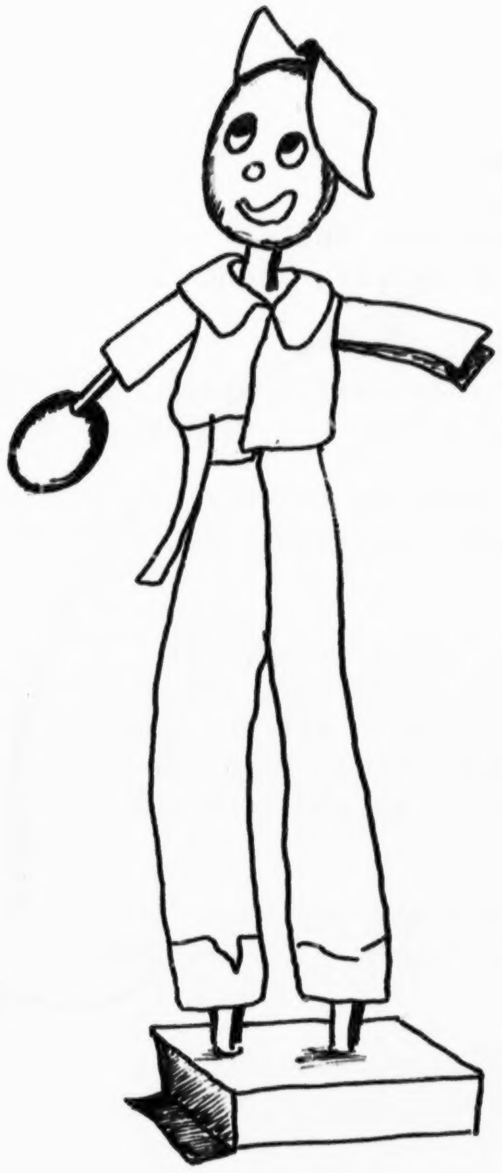


Pierre was a talking dog. He spoke French and was learning Engligh. He always wore a beret and a blue jacket. He lived in a village called Holiday where no dog went to school and no dog had to do any work. They lived on the money that dropped off rose bushes when a new leaf was formed. With these rose bushes the dogs of Holiday were rich in no time. Luckily for the dogs of Holiday, the dogs of other cities thought the rose bushes were nonsense. Pierre's hobby was painting (as most French dogs). He liked it. Sometimes the pictures Pierre painted came to real life. The flowers, birds, and trees he painted would suddenly pop out of the hills or even a yard.

One day Pierre was walking in the park when he saw a beautiful girl (dog). Her name was Anna Maria von Dingleburger. Pierre found that painting was a hobby of Maria's too. Once he painted a picture of a tower for her, a tower that came to real life and grew so big, that it is now known as the Eiffel Tower. As this great wonder grew, Anna Maria became so fascinated with him that she found herself slowly falling in love with Pierre. At last Anna and Pierre were married and had a son which they named George.

Pierre enjoyed painting pictures of nature and all the beautiful things he saw about him. One day he decided he might paint a picture of the mountain he saw in the distance. George, his son, was playing near by with a pair of scissors, and on seeing the picture that Pierre had started took his scissors and cut off the top of the mountain. Pierre was horrified, and to his surprise the mountain started to bubble and boil. And then it blew up! That is all that any one knows about Pierre. He was never seen again. It is thought by some that Pierre was completely covered by the volcano.

- - Cecily, Grade 4



Have you ever met Gus Greenthumb? If you have not, please meet him and listen while I tell you his story.

People called him Gus Greenthumb because he could grow anything. He once grew pumpkins as large as a small car and he became famous for his grapes which were as big as lampshades. He could take a piece of paper, moisten it, and grass would grow.

I can tell you that there was hardly anything that Gus could not grow or do.

Gus himself lived to be three hundred and ninety years. His death was caused from an acute case of crab grass poisoning which had infected his green thumb.

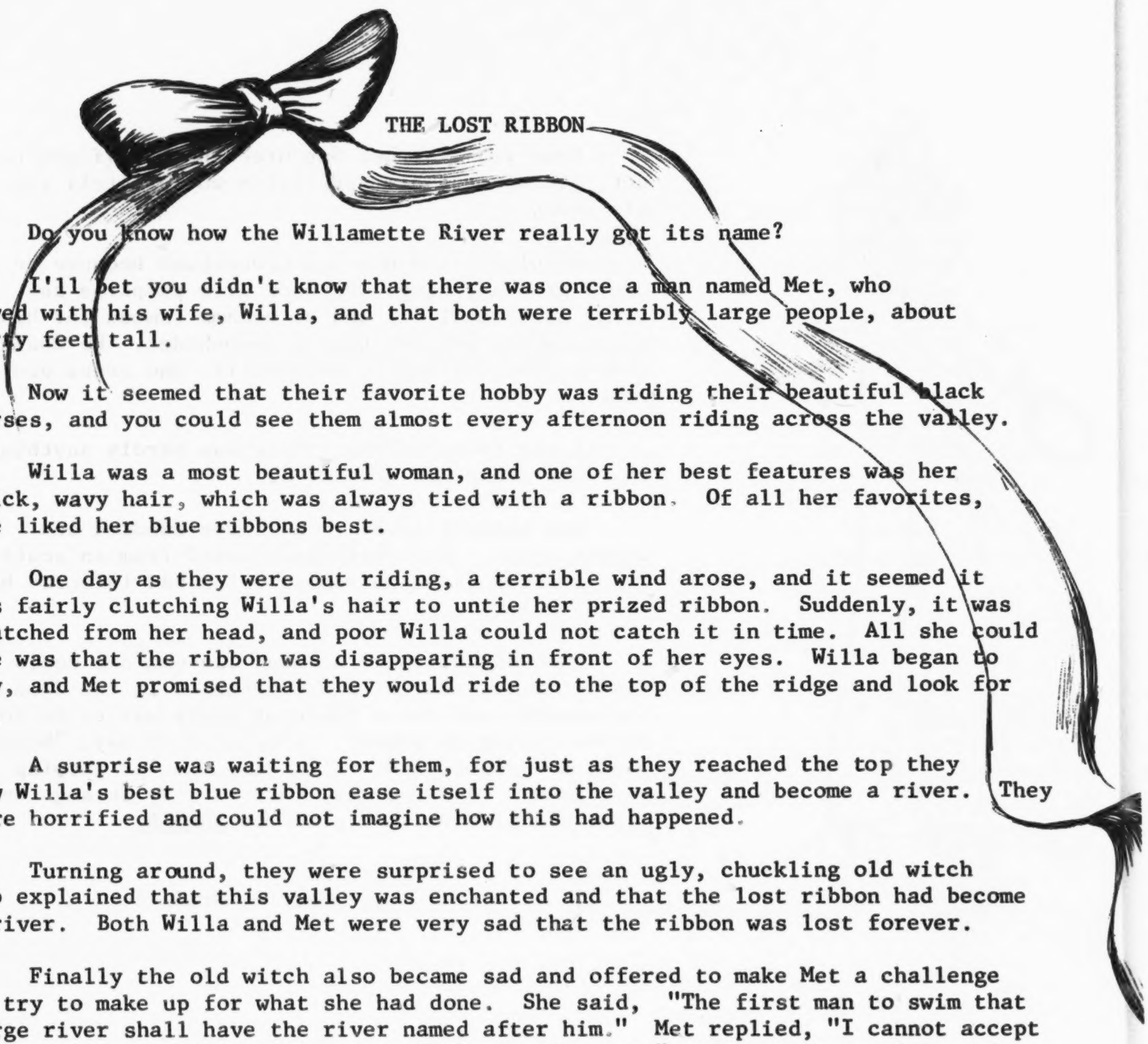
Upon the grave of strange old Gus one could find flowers, fruits, and vegetables in the dead of the winter, and not a blade of grass was to be found in the spring or summer. People would say, "Never mind, now never mind, it is just old Gus showing off again." And you see, this is very strange because all of this took place in ALASKA.

- - Carrie, Grade 4

This is a good illustration of a child writing his own "tall tale" or exaggerated story. An opportunity to make his hero "come alive" provides an excellent outlet for his creative ability.

It is unfortunate that this illustration could not have been in color because one cannot appreciate the use of materials and the ingenious manner in which a child can assemble them to represent his idea.

Gus' head is made from an empty yellow plastic lemon. His suit is cut from scraps of discarded felt. His body skeleton comes from willow trigs, and on his hand an oversized green plastic Easter egg represents his thumb. Hence, Gus Greenthumb was born!



THE LOST RIBBON

Do you know how the Willamette River really got its name?

I'll bet you didn't know that there was once a man named Met, who lived with his wife, Willa, and that both were terribly large people, about forty feet tall.

Now it seemed that their favorite hobby was riding their beautiful black horses, and you could see them almost every afternoon riding across the valley.

Willa was a most beautiful woman, and one of her best features was her thick, wavy hair, which was always tied with a ribbon. Of all her favorites, she liked her blue ribbons best.

One day as they were out riding, a terrible wind arose, and it seemed it was fairly clutching Willa's hair to untie her prized ribbon. Suddenly, it was snatched from her head, and poor Willa could not catch it in time. All she could see was that the ribbon was disappearing in front of her eyes. Willa began to cry, and Met promised that they would ride to the top of the ridge and look for it.

A surprise was waiting for them, for just as they reached the top they saw Willa's best blue ribbon ease itself into the valley and become a river. They were horrified and could not imagine how this had happened.

Turning around, they were surprised to see an ugly, chuckling old witch who explained that this valley was enchanted and that the lost ribbon had become a river. Both Willa and Met were very sad that the ribbon was lost forever.

Finally the old witch also became sad and offered to make Met a challenge to try to make up for what she had done. She said, "The first man to swim that large river shall have the river named after him." Met replied, "I cannot accept that challenge unless you include Willa in the name." After much arguing, the old witch agreed.

Bravely, Met climbed a high rock and plunged into the cold, rushing water. Willa was very scared that he couldn't make it against the strong current. Then she saw him in the middle of the river, swimming with all his might for the opposite shore. He reached the bank, and Willa was very happy.

The witch kept her promise, and on that very day named the river "Willa-Met" or "Willamette."

- - Mary Beth, Grade 4

Children love to write family stories which have been kept alive by being passed from one generation to another. These two stories were included in the Literary Magazine, an interest-group project, described earlier.

The Seed Thrower

One day my grandfather was out for a walk when he saw a man in a nearby field slowly walking along the freshly ploughed earth throwing seed from side to side. As he watched the man working, he was suddenly startled to see another man in the joining field, doing the same kind of work, but working much faster and quickly throwing the seeds.

My grandfather asked the man, "Why are you going along so very fast?"

"Why," answered the man quickly, "I want to get to the end of the row before I run out of seed."

This story has been handed down from my grandfather, to my father, to me.

- - Kent, Grade 5

Thick Skins

When my great grandmother saw the orange peddler, she would go out and question him about the oranges he was selling.

She asked, "Are they nice and smooth? Do they have real thick skins?"

"Oh! yes," said the peddler.

"Are you quite sure?" she would say.

"These oranges have the thickest skins I've ever seen."

"Well," she said, "Then I do not want any."

- - Jenny, Grade 5

My great-grandmother told this story to my grandmother, who told it to my mother, who told it to me.

POETRY

What has been happening when several children ask, "Do you care if I write a poem instead of a story?" Perhaps some of the following experiences may have occurred as it does in the classroom described below.

1. Poetry is read to the children. The children read poems individually. They read them together, in a chorus, record and listen to them, and in general really live with poetry. There is good oral interpretation by the teacher.

2. The children are given an opportunity to just talk incidentally and to exchange and share ideas.

3. Children work with words to find new and fresh replacements for the old worn ones.

4. Subjects chosen are on the children's level and not on the adult level. As Carl Sandburg once said, "You can never make moon poems for people who never saw the moon."

5. Children feel the rhythm that ideas suggest. They have an opportunity to show the rhythm by using a drum, humming, or by any other means they choose, without the teacher specifically calling their attention to rhythm as such.

6. They enjoy hearing and reading other children's poetry.

7. There is some very effective group work in this area as well as individual work.

8. Children love and are actively interested in humorous poetry. They read it and discover the rhythmic pattern. . . . . however, they are not restricted to rhythmic patterns.

ACTIVITIES TO STIMULATE AN INTEREST IN WRITING POETRY

1. An introduction to the writing of Haiku poetry. (Pronounced "high-coo") Haiku is a Japanese poetry form intended to "express and evoke" emotion. It is a very short poem consisting only of three unrhymed and unmetered lines. The first line must contain only five syllables; the second line, seven syllables; the third line, five.

This type of activity came with the interest factor built in. To begin with, here was something entirely new. This was an experience the children had never shared. Some found the very word "Haiku" fascinating to them, and it was great sport to "brandish" the term.

The history of the poetry itself was very fascinating to the children. They loved to listen to samples of this type of art.

With even this meager background, I found them ready and ardent to try Haiku. At the risk of violating all rules of writing Haiku this teacher did not begin by making an attempt to limit their productions to a 5 - 7 - 5 pattern, although this was mentioned and clearly noted. Our efforts were at the beginning just attempts at writing Haiku, an effort to get children to express their feelings in clear-cut pictures of three lines. Once this was accomplished, and an opportunity given to read some of their writing, pattern was no difficulty. This type of activity can become infectious. Before all of this was over our PRINCIPAL was writing agenda items for a staff meeting in Haiku. An excellent folder of material on Haiku is available from the Resource Library.

2. Use Elizabeth Coatsworth's poem, "Swift Things Are Beautiful" and Sara Teasdale's "Barter" to stimulate imagination, etc. "What are other things that you think are beautiful?"

3. Topics that especially interest fifth graders:

   Pets
   Wishes
   Special People (Lincoln, Washington, Boone, Clara Barton, etc.)
   Water (Nature)
   Seasons of the Year (autumn, spring, etc.)
   Stars and Night
   Space
   Holidays (Christmas, Mother's Day)
   Animals
   Humor

4. Poems based on the listening skill.

   I Heard the Ghost Saying etc.

   The Storm Told Me

   Only the Wind Knew

5. Poems that paint pictures for children.

   (Carl Sandburg's "Fog")

6. Teachers talking over experiences with children.

   Last night I saw a star falling
   I remember when

7. Guiding the children in their choice of words.

   New words, quiet words, tired words, (pretty, nice), using new words when writing, etc.

8. Therapeutic Values

   "My Secret" "Me" "The Trouble With My Brother"

9. Children can make their own anthologies of poetry, or a collection of their favorites.

Introducing Haiku

This is an attempt at "Haiku" with no effort to follow the 5-7-5 pattern. You will notice that this type of poetry contains three lines and can seldom give much detail. The rest the reader must fill in for himself.

Deer leaps. . .
Gun cracks
All is still!
- - Scott, Grade 4

Green cedar tree
Wind rocking gently
Time to sleep.
- - Cindy, Grade 4

The pine tree
Spreads its branches
For birds are nesting there.
- - Cecily, Grade 4

Old man sits in chair rocking
Time goes
Without reason.
- - David, Grade 4

A beautiful rose
Stands alone
Petals dropping softly.
- - Daniel, Grade 4

Summer brings
Autumn gives
Winter takes.
- - Carl, Grade 5

Alone was I
In the sunset
Afraid!
- - Mary Beth, Grade 5

Underneath moon sky
A child sits alone
Waiting for the sunset.
- - Jenny, Grade 5

Wind blows
Trees bow down
Let clouds pass.
- - Lester, Grade 5

Storm rising
Trees bend
Rhythmic.
- - Denise, Grade 5

Forest deep, dark
Boy cries
No mother to dry eyes.
- - David, Grade 6

Fire flickers
Stars bright
Closing in.. Night!
- - Jan, Grade 6

Golden leaf falls
Bright. . Moment of glory
Too soon dead!
- - Gayle, Grade 6

The Greatest Speech

The hour was late, the lights were dim.
One man was awake, sad-eyed and thin.
This man was Abraham Lincoln.
He was making history
And little did he know,
What it would come to be.

Just ten sentences it was to be,
And a failure as he would see;
But the words which he spoke that day
Became almost as famous as he.

- - Paul, Grade 4

(Poems about special people)

Caddie Woodlawn

Caddie Woodlawn was eleven,
But right now she's 82.
Caddie played with brothers always,
Started wearing boy's clothes, too.

Caddie's father didn't mind,
But Caddie's mom was in despair.
Caddie ran all through the forests,
And her feet were always bare.

When her Uncle came to visit,
On a hunting trip she went.
From a boat she fell in the water,
Got her muscles stiff and bent.

When her uncle had to leave her,
He took her playmate....'twas her dog.
And then he left in his boat. . .
Through the dark and heavy fog.
- - Roberta, Grade 5

(Here a poem is used as a book report.)

My Brother

My brother says it is just routine,
When showing off by being mean.

Sometimes I'll dream he fell into a pit,
But I wake up only to be hit.

My brother pounds me everyday,
I don't know why I don't run away.

- - Carrie, Grade 4

(Poems used as therapeutic values.)

Things I Like

A mother's touch,
A baby's laugh,
The dew like silver
On the grass.

A summer day,
With clear, blue sky
And puffs of cloud,
Where birds now fly.

The fire light
On the silver hair,
Of an old grandmother
Sitting there.

The love that only
Youth can give.
This is the love
That makes you live.

The silent reverence,
Holy, and still,
That brings God near you,
Your heart to fill.

- - Meredith, Grade 6

Christmas at Home

Way a-top the Christmas tree,
There are so many things to see.
Red and green lights all aglow,
Children running to and fro.
Presents wrapped up so nice and neat
Odors from the kitchen all so sweet.
"Tis the time for joy and mirth,
The day we celebrate the Christ Child's birth.

(Poems for special holidays.)

Autumn

Autumn's cool and hazy days,
After summer's heat.

The trees standing tall and bare,
The wind around them sweeps.

Geese honking, over head,
As to the south they fly.

The smell of bonfires burning,
Their smoke arising to the sky.

The golden harvest moon,
That shines on every cool clear night.

And the crisp morning air on every chance will bite.

These make Autumn.

- - Judith Grade 6

Lace

A lacy form
Against the sky;
For in the autumn
Leaves did fly.

The trees they have
Their leaves no more,
And on the shore
Of the deep sea of air,
The beautiful, lacy,
Trees are there.

- - Meredith Grade 6

Pine Tree

Tall pine tree
In a deep, dark wood,
You protect the woodland creatures
In the way you should.

The birds may build their nests
In your branches high,
To school their little fledglings
And teach them how to fly.

- - Judith and Meredith
Grade 6

Spring?

"Spring!" you say when you see a robin hopping on the lawn,
And you hear the sweet and musical notes of a meadowlark's sweet spring song.
Then down comes the snow, or fog, or rain, (especially the rain.)
And covers all despite your hopes for spring to come again.

"Spring!" you say when you see a patch of blue in the sky among the gray,
And you see the sun, oh my, what fun! Maybe spring will come today!
But the patch of blue disappears from view, and the sun doesn't melt the snow,
And you wish that winter would let spring in and that winter would go.

"Spring!" you say when you see a daisy struggling through the frozen ground.
But Jack Frost kills the poor weak flow'r when the next cold spell comes around.
So, one bird, or flow'r, or one patch of blue, sometimes doesn't mean a thing,
But don't be discouraged, some day it will be Spring.

- - Julie Grade 6

(Poems for the seasons of the year.)

Autumn Outdoors

Autumn outdoors-what a wonderful thing,
When all the world just seems to sing!

The colors-so pretty-red, yellow, and brown,
A splash of color throughout the town!

But better than that-I love the rain,
And when the sun comes out again

And shines in the sky so very blue,
And not a cloud within it, too,

The air is so crisp, such a sheer delight,
That you'd like to shout with all your might!

The rustling of leaves at every step,
Some one raking them with lots of pep!

And then a fire spark far upward soars-
This is autumn-autumn outdoors!

- - Julie Grade 6

The Soldier

I saw a rose bush

Standing allalone

Guarding the grave

Of all the other flowers.

All through the winter,

Through the snow and the rain,

Waiting for his brothers to see the sun again.

To flowers, Death is just a door,

To bring them to life once more.
- - Rebecca Grade 6

Come Away With Me

Come away with me to a fair, far-away land,
Where the little waves lap on the yellow sand.
Where monkeys chatter in the coconut trees,
And there are no cages for the animals are free.

The elephants are colored in blue and pink and red.
There is a green-eyed chimp that never goes to bed.
He has an alligator friend with a big bushy tail
And if he saw the likes of you he'd give an awful wail.

There's a little purple house with glass shells all around
And you can reach it from Swan's Lake with a great big bound.
There's a little crooked Main Street running east and west
And the people walking up and down are just the very best.

A princess in a silken robe, followed by a page.
A black-gowned wizard with a parrot in a cage.
Coming from the mountain is a little brown elf
Who brings precious stones for the princess's shelf.

Come away with me, then to a land far away,
Just for a little while if you feel you cannot stay.
All the days are sunny and each night a big bright star
Sprinkles golden dust on you from a land way afar.

- - Jeanne, Grade 6

Peace and Quiet Land

Away, away so far away
The shore is purple sand
This place is where I'd like to stay
Called Peace and Quiet Land.

The people talk a happy talk
In Peace and Quiet Land
They've never, never heard of work -
Just play - upon the sand.

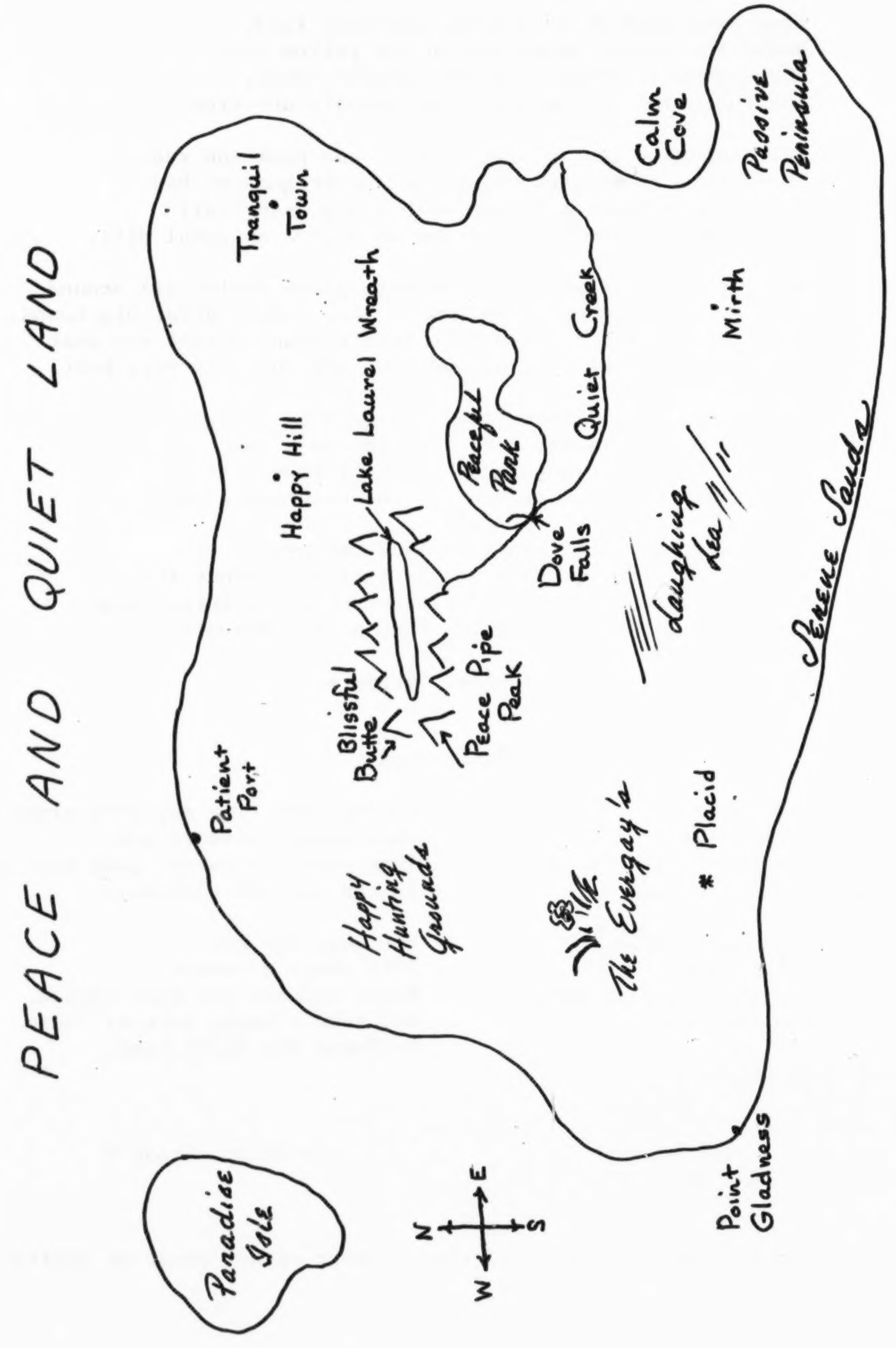
They dream good dreams -
In happy times
They've never heard of war.
Oh its the land I want to see
That peaceful purple shore.

Perhaps the time may come right here
When people live to say
That peace on earth, good will to men
Is the one and only way.

But just for now
I'll chart a course
Where trouble has been banned.
And take a happy journey there
To Peace and Quiet Land.

- - Chris Grade 6

Examples of "Fun and Fantasy" as an idea to promote either prose or poetry.


PEACE AND QUIET LAND
Tranquil Town
Happy Hill
Lake Laurel Wreath
Peaceful Park
Quiet Creek
Calm Cove
Passive Peninsula
Mirth
Dove Falls
Laughing Lea
Serene Sands
Blissful Butte
Peace Pipe Peak
Patient Port
Happy Hunting Grounds
The Evergay's
Placid
Point Gladness
Paradise Isle
N
E
S
W

BIBLIOGRAPHY

Applegate, Mauree, Easy In English, Evanston, Illinois, Row, Peterson and Co., 1960.
Imaginative and creative approach to the teaching of the language arts. Many ideas and suggestions. Curriculum library.

________________, Helping Children Write, Scranton, Pennsylvania, International Textbook Co., 1948.
Varied techniques and approaches to helping children write creatively.

________________, "To Make Mechanics Serve Ideas", The Grade Teacher, June, 1957.

________________, Winged Writing, Evanston, Illinois, Row, Peterson and Co., 1961.
Imaginative poems and stories of school children from grades 4 through 8. Curriculum Library.

Burrows, Alvina T., Ferebee, June D., Jackson, Dorothy C., and Saunders, Dorothy O., They All Want to Write; Written English in the Elementary School rev. ed. New York, Prentice-Hall, Inc., 1952.

Carlson, Ruth K., "Stimulating Creativity in Children and Youth," Elementary English Magazine, XXXCIII, March, 1961, pp. 165-169.

* De Haan, Robert F. and Kough, Jack, Helping Children With Special Needs, Teacher's Guidance Handbook Vol. 2, Chicago, Science Research Associates, Inc., 1956, Chapter 6.

* Fliegler, Louis A., Curriculum Planning for the Gifted, Englewood Cliffs, N.J. Prentice-Hall Inc., 1961.
Excellent suggestions for teaching creative writing.

Greene, Harry A., and Petty, Walter T., Developing Language Skills in the Elementary School, Boston, Allyn and Bacon, Inc., 1959.
Presents practical and realistic approaches.

* Haiku Poetry. Folder is available at the Resource Library.

* Henderson, Harold G., An Introduction to Haiku, New York, Doubleday and Co., 1958.
An anthology of poems from Basho to Shiki.

Hook, Edward N., "A Dozen Methods for Stimulating Creative Writing," Elementary English Magazine, XXXCIII, February, 1961, pp. 87-88.
These are a teacher's suggestions, one who has been successful in stimulating creative writing.

* Miel, Alice, Creativity in Teaching, Belmont, California, Wadsworth Pub. Co., 1961.

National Council of Teachers of English, Commission on the English Curriculum Language Arts for Today's Children, N.C.T.E. Curriculum Series, Vol. II, New York, Appleton-Century-Crofts, Inc., 1954.
Good for sources. Curriculum library.

Struck, F. F., *Creative Teaching*, New York, John Wiley and Sons, Inc., 1938.

Wilson, Robert, "Creativity," *Education for the Gifted*, Fifty-Seventh Yearbook Of the National Society for the Study of Education, Part II, N. B. Henry, ed., Chicago, Illinois, University of Chicago Press, 1958, pp. 108-126.
Good list of suggested topics. Curriculum library.

Wilt, Miriam E., *Creativity In the Elementary School*, New York, Appleton-Century-Crofts, Inc., 1959.
A point of view about creative expression.

GREAT BOOKS

The gifted child is usually an able and avid reader. The reading of good literature plays a large part in enlarging his experiences, increasing his vocabulary, and perhaps even influencing his character.

The prime objective in using the Great Books program in Workshop classes and in interest groups is not only to stimulate a real enjoyment of books, but also to aid in the development of a finer taste in the selection of books.

Leland Jacobs says that a rich and balanced contact with literature is a requisite of a truly comprehensive developmental reading program. He gives the following guides for this matter of balance as teachers select materials for children:

> Provide a balance of contemporary literature and great stories or classics.
> Provide a balance of realistic and fanciful literature.
> Provide a balance of fictional and informational literature.
> Provide a balance of periodical and book reading.
> Provide a balance of expensive and inexpensive books.
> Provide a balance of popular materials and precious materials.
> Provide a balance of prose and poetry.

In speaking of the balance between contemporary literature and the classics he says that contemporary literature provides children with books that are directly their own. These books are written by authors who comprehend the modern child's mind, the tempo of his world, his delights and enthusiasms, and the language that he understands. Contemporary literature explores and illuminates the wishes, hopes, desires and values of the present generation of young readers and thus relates them to their physical, social and spiritual world. The great stories link children with their heritage from the past and join this generation with all humanity. The children's classics transcend time by dealing with themes that are perennially both old and new: home and family life, adventure, fancy, animals. In balancing the contemporary and the classical, the teacher will do well to assure experiences with many kinds of modern literature and some well selected great stories.[1]

In writing about enjoying great stories and classics, Mabel Altstetter says that there are no stories or books that every child should read. There are many that can bring pleasure and profit to countless children when they are ready to enjoy them.

A real disservice is done by adults to both children and books by insisting that children read certain books just because they are, in the judgment of grownups, good for children. An acceptance of the findings of modern education with their implications for guiding children's reading is absolutely necessary to successful attempts to create taste and lifetime interests.

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[1] Leland B. Jacobs, "Providing Balanced Contacts with Literature for Children," Literature with Children (Washington, D.C., Association for Childhood Education International, 1961), pp. 2-4.

There is little disagreement that a really good story or a classic is a piece of writing that has achieved a place in the minds and hearts of people--for its meaning and its beauty of style. It has stood the test of time; it has something for people of all ages no matter where they live. It has lived because it is alive and not because it is on the required reading lists, kept alive under the oxygen tent of a teacher's insistence that it is something that must be read.

To give children a meaningful experience with good writing one must be willing to start where children are and to recognize that it is possible to change taste and appreciation by gradual growth and not by sudden great leaps. To speak disparagingly of what a child enjoys brings almost certain failure in raising the level of enjoyment.

Enjoyment should be the primary consideration in experiences with all worthwhile books. All children will not respond alike to good books. Some may never catch the glory, but most children may be guided to better taste as a lifelong possession and an abiding joy in greatness in literature.[1]

Junior Great Books
1962-1963

AUTHOR	TITLE
Alcott, Louisa May	Little Women
Barrie, James M.	Peter Pan
Burnett, Frances Hodgson	The Secret Garden
Carroll, Lewis	Alice's Adventures in Wonderland
Church, Alfred, J.	The Iliad of Homer
Church, Alfred, J.	Odyssey of Homer
Collodi, C.	Adventures of Pinocchio
Defoe, Daniel	Robinson Crusoe
Dickens, Charles	A Christmas Carol
Dodge, Mary Mapes	Hans Brinker
Forbes, Esther	Johnny Tremain
Heyerdahl, Thor	Kon-Tiki
Irving, Washington	Rip Van Winkle and the Legend of Sleppy Hollow
Jacobs, Joseph	Fables of Aesop
Kipling, Rudyard	Jungle Book
Krumgold, Joseph	Onion John
Lamb, Charles and Mary	Tales from Shakespeare
Lang, Andrew	Arabian Nights
Latham, Jean Lee	Carry On, Mr. Bowditch
Lofting, Hugh	Voyages of Doctor Doolittle
Pyle, Howard	Story of King Arthur and His Knights
Seredy, Kate	The Good Master
Stevenson, Robert Louis	Treasure Island
Tarkington, Booth	Penrod
Twain, Mark	Adventures of Tom Sawyer
Verne, Jules	Twenty Thousand Leagues Under the Sea
Wyss, John D.	Swiss Family Robinson

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[1] Mabel F. Altstetter, "Enjoying Great Stories and Classics," Literature with Children (Washington, D. C., Association for Childhood Education International, 1961), pp. 6, 10.

Junior Great Books
1963-1964

Andersen, Hans Christian	Fairy Tales
Averill, Esther	Cartier Sails the St. Lawrence
Blair, Walter	Tall Tale America
Brink, Carol R.	Caddie Woodlawn
Brunford, Sheila	The Incredible Journey
Carlson, Natalie S.	A Brother for the Orphelines
Carr, Mary Jane	Children of the Covered Wagon
Colum, Padraic	Children of Odin (5)
De Angeli, Marguerite	Door in the Wall
Estes, Eleanor	The Moffats
Franchere, Ruth	Willa: The Story of Willa Cather's Growing Up
Gipson, Frederick B.	Old Yeller
Grahame, Kenneth	Wind in the Willows
Graham, Shrley and George Dewey Lipscomb	Dr. George Washington Carver, Scientist
Grimm	Fairy Tales
Henry, Marguerite	Brighty of the Grand Canyon
	King of the Wind
Hosford, Dorothy G.	Thunder of the Gods (5)
Kjelgaard, James A.	Big Red
Krumgold, Joseph	And Now Miguel
McCloskey, Robert	Homer Price
Meigs, Cornelia L.	Invincible Louisa
Norton, Mary	The Borrowers
Pyle, Howard	The Merry Adventures of Robin Hood
Salten, Felix	Bambi
Sperry, Armstrong	Call It Courage
White, E.B.	Charlotte's Web
Wilder, Laura Ingalls	Little House on the Prairie

These sets of books are available through the Curriculum Library. Each set of books consists of ten copies of the same book with the exception of the Norse myths. Five each of *Children of Odin* and *Thunder of the Gods* will be in the same box.

A collection of books on Leonardo Da Vinci will be available as a set. Included in this set are:

Hahn, Emily, *Leonardo Da Vinci* (8)
Levinger, Elma Ehrlich, *Leonardo Da Vinci*
Linscott, Robert N., *The Notebooks of Leonardo Da Vinci* (5)
Ripley, Elizabeth, *Leonardo Da Vinci*

JUNIOR GREAT BOOKS FOR THE INTERMEDIATE GRADES
LEVEL 2

ANIMAL	REALISM and ADVENTURE	FABLE, EPIC, and MYTH	FOLK
BIG RED	KON-TIKI	NORSE MYTHS:	ARABIAN NIGHTS
KING OF THE WIND	TOM SAWYER	CHILDREN OF ODIN	RIP VAN WINKLE and LEGEND OF SLEEPY HOLLOW
JUNGLE BOOKS	TREASURE ISLAND	SONS OF THE VOLSUNGS	
OLD YELLER	SWISS FAMILY ROBINSON	THUNDER OF THE GODS	
	LITTLE WOMEN	KING ARTHUR AND HIS KNIGHTS	
	ROBINSON CRUSOE	ODYSSEY OF HOMER	
	ONION JOHN	ILIAD OF HOMER	
	PENROD	MERRY ADVENTURES OF ROBIN HOOD	
	TWENTY THOUSAND LEAGUES UNDER THE SEA		
LEVEL 1			
BAMBI	HOMER PRICE	FABLES OF AESOP	GRIMM'S FAIRY TALES
BRIGHTY OF THE GRAND CANYON	SECRET GARDEN	WIND IN THE WILLOWS	TALL TALE AMERICA
	THE MOFFATS		

JUNIOR GREAT BOOKS FOR THE INTERMEDIATE GRADES

LEVEL 2

FANCIFUL	BIOGRAPHY	HISTORICAL	OTHER LANDS and PEOPLE
PETER PAN	DR. GEORGE WASHINGTON CARVER: SCIENTIST	JOHNNY TREMAIN	HANS BRINKER
ALICE'S ADVENTURES IN WONDERLAND	LEONARDO DA VINCI	CARRY ON, MR. BOWDITCH	AND NOW MIGUEL
	INVINCIBLE LOUISA		CALL IT COURAGE
LEVEL 1			
ANDERSON'S FAIRY TALES	CARTIER SAILS THE ST. LAWRENCE	CHILDREN OF THE COVERED WAGON	DOOR IN THE WALL
CHARLOTTE'S WEB	WILLA	CADDIE WOODLAWN	GOOD MASTER
THE BORROWERS		TALES FROM SHAKESPEARE	A BROTHER FOR THE ORPHELINES
VOYAGES OF DOCTOR DOLITTLE		LITTLE HOUSE ON THE PRAIRIE	
ADVENTURES OF PINOCCHIO			

JUNIOR GREAT BOOKS

The following books have been
recommended by the Great Books Foundation.

FIFTH GRADE LIST

Author

1. Bible: Daniel and the Lion
   Noah and the Ark

2. Aesop: Fables (selections)
   1. The Dog and the Shadow
   2. The Lion's Share
   3. The Town Mouse and the Country Mouse
   4. The Fox and the Crow
   5. The Lion and the Mouse
   6. The Wolf and the Kid
   7. The Fox and the Stork
   8. The Frog and the Ox
   9. Androcles
   10. The Ant and the Grasshopper
   11. The Fox and the Grapes
   12. The Dog and the Wolf
   13. Hart and the Hunter
   14. The Wolf in Sheep's Clothing
   15. The Dog in the Manger
   16. The Shepherd's Boy
   17. The Two Crabs
   18. The Two Fellows and the Bear
   19. The Two Pots
   20. The Four Oxen and the Lion
   21. The Goose With the Golden Eggs
   22. The Wind and the Sun
   23. The Man, and Boy and the Donkey
   24. The Miser and His Gold
   25. The Fox Without a Tail
   26. Belling the Cat
   27. The Hare and the Tortoise
   28. The Hare With Many Friends
   29. The Bundle of Sticks
   30. The Ass's Brains
   31. The Eagle and the Arrow
   32. The Milkmaid and Her Pail
   33. The Cat-Maiden
   34. The Fox and the Goat
   35. The Man and the Serpent
   36. The Tree and the Reed

3. Arabian Nights: Aladdin   Aladdin and Other Tales

4. Franklin: Poor Richard's Almanac (selections)

5. Grimm: Fairy Tales
   1. The Bremen Town-Musicians
   2. Rapunzel
   3. The Fisherman and His Wife
   4. The Valiant Little Tailor
   5. The Girl Without Hands
   6. Thumbling
   7. Thumbling as Journeyman
   8. The Two Kings' Children

6. Lamb: Tales From Shakespeare
   Macbeth
   The Tempest

7. Ruskin: *King of the Golden River*

8. Dickens: *Christmas Carol*

9. Andersen: Fairy Tales
   1. The Emperor's New Clothes
   2. The Ugly Duckling
   3. The Little Sea Maid
   4. The Constant Tin Soldier
   5. The Buckwheat
   6. Tinderbox
   7. The Darning Needle

10. Hawthorne: The Snow Image

11. Carroll: Alice in Wonderland

12. Twain: Adventures of Tom Sawyer

13. Browning: Pied Piper of Hamelin

14. Stevenson: Treasure Island

15. Kipling: Jungle Book

SIXTH GRADE LIST

1. Bible: Joseph Story
   Jonah and the Whale

2. Hippocrates: Oath and Law

3. Hippocrates: Song of Roland

4. Arabian Nights: Sinbad

5. Malory: King Arthur and His Knights

6. Galileo: Starry Messenger

7. Defoe: Robinson Crusoe

8. Swift: Gulliver's Travels (parts I and II)

9. Blake: Songs of Innocence

10. Lamb: Tales from Shakespeare
    King Lear
    Hamlet

11. Irving: Rip Van Winkle and
    Legend of Sleppy Hollow

12. Dana: Two Years Before the Mast

13. Hawthorne: Tanglewood Tales
    1. The Pomegranate Seeds
    2. The Dragon's Teeth

14. Carroll: Alice Through the Looking Glass

15. Verne: 20,000 Leagues Under the Sea

The Great Books Foundation
5 South Wabash Avenue
Chicago 3, Illinois

BIOGRAPHIES

Biography and biographical fiction are of interest to many children. Opportunities for growth in their ability to do creative thinking may be provided through reading and comparing several sources about one man. For example Abraham Lincoln by James Daugherty, Abraham Lincoln by Genevieve Foster, Abe Lincoln Grows Up by Carl Sandburg, Abraham Lincoln: An Initial Biography by Genevieve Foster, are available in the Resource Library. These books plus material from encyclopedias would provide the basis for a broad viewpoint, avoiding the bias shown by one author, and showing what is true, what is legend, and what is pure fiction. Also available are several books on da Vinci and Benjamin Franklin.

Children are fascinated by the reading of Carry On, Mr. Bowditch, by Jean Lee Latham, the story of a boy who had only his curiosity to teach him figures, and the achievements of the versatile Leonardo da Vinci in Emily Hahn's Leonardo da Vinci. Both of these books offer a good introduction to the reading of biography.

Biographies in the Resource Library

American Heritage	Thomas Jefferson and His World
Cousins, Margaret	Ben Franklin of Old Philadelphia
Daugherty, James	Abraham Lincoln
Daugherty, James	Of Courage Undaunted (Lewis and Clark)
Eaton, Jeanette	America's Own Mark Twain
Eaton, Jeanette	That Lively Man, Ben Franklin
Forbes, Esther	Johnny Tremain
Foster, Genevieve	Abraham Lincoln: An Initial Biography
Foster, Genevieve	Abraham Lincoln's World
Foster, Genevieve	Augustus Caesar's World
Foster, Genevieve	George Washington's World
Foster, Genevieve	The World of Capt. John Smith
Garst, Shannon	Joe Meek
Hahn, Emily	Leonardo da Vinci
Hunt, Mabel Leigh	Better Known As Johnny Appleseed
Koch and Peden	Thomas Jefferson and Selected Writings
Latham, Jean Lee	Carry On, Mr. Bowditch
Levinger, Elma	Galileo
Levinger, Elma	Leonardo da Vinci
Linscott, Robert	The Notebooks of Leonardo da Vinci
Lisitzky, Genevieve	Thomas Jefferson
Nolan, Jeanette	Florence Nightingale
Ripley, Elizabeth	Leonardo da Vinci
Rosen, Sidney	Galileo and The Magic Numbers
Sandburg, Carl	Abe Lincoln Grows Up
Sootin, Harry	Michael Faraday
Van Dorn, Carl	Benjamin Franklin's Autobiographical Writings
Yates, Elizabeth	Amos Fortune: Free Man

OUR LANGUAGE

This material is planned to provide a sequence in the study of our language. It is hoped that the following suggestions will stimulate an interest in the further study and understanding of our language.

Purposes of the unit:

To become aware of the various ways in which man communicates
To understand that words are symbols for meaning and, like other symbols, are useful only if they hold meaning for the giver and the receiver
To appreciate the contributions of various cultures in the formation of our language
To appreciate the interesting history of specific words and our language in general
To understand that our language is a living language, continually changing.
To become aware of shades of meaning through choice of words

SIGNS, SYMBOLS, and CODES

PEOPLE, PLACES, and THINGS

KEYS of MEANING

SIGNS, SYMBOLS, AND CODES

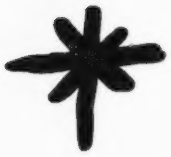
Possible areas of interest:

- Flag signals (wigwag, semaphore, flags of identification-boy scout, pirate, etc.)
- Whistle signals (boat, train, national defense, logging-whistle punk)

- Light signals (highway, railroad, aviation, ships)

- Electronic signals (television, radio, telegraph)
- Map symbols (compass, railroad, highway, bridge, city, etc.)

- Mathematic symbols
- Religious symbols

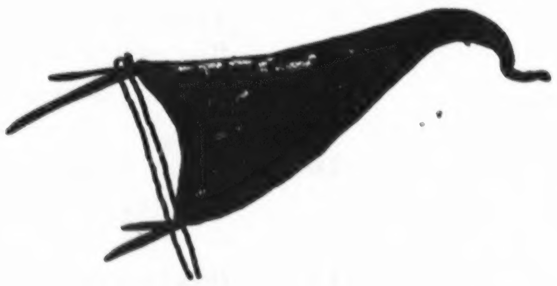


- Chemical symbols

- Astronomy symbols
- Weather symbols
- Music symbols
- Architecture and building symbols

- Signs of the zodiac
- Good luck symbols
- Woodcraft symbols
- Phonetic symbols (include shorthand)

- Proof-reading symbols
- Diacritical markings
- Punctuation



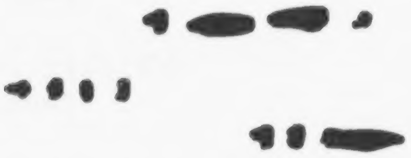
- Braille
- Arm and hand signals (sign language of the deaf, airport, etc.)
- Indian sign language
- Professional symbols (doctor, pharmacist, engineer)

Highway signs (stop, curve, railroad, etc.)

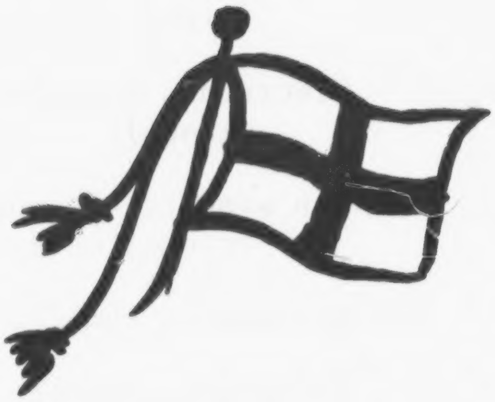
Holiday symbols

Codes (secret service, original)

ggested activities:



1. Hypothesize why certain signs and symbols have remained in use over long periods of time and why certain symbols are used internationally.



2. Choose an area of interest and make a collection of related symbols. Make a scrapbook, poster, a chart or bulletin board display. Try to trace their origins and meanings.

3. Construct a telegraph transmitter and practice the Morse code.

4. Visit the local telegraph office to see how messages are sent and received.

5. Interview people who work with signals of some kind. Take notes or draw sketches to report back to the class.

6. Visit the Southern Pacific and observe the signals used.

7. Make a table top highway or railroad scene complete with signals.

8. Compare symbols from a variety of maps. Make a composite and include any variations you may find.

9. Make an original map of an amusement park, national forest recreation area or your private island. Remember to make a key for the symbols you use.

10. Make a geometric design using mathematical symbols.

H_2O

11. Design a stained glass window for a new church using religious symbols.

$C_nH_{2n}+2$

12. Find out what elements are contained in your body and make a list of the chemical symbols.

13. Write the chemical symbols for some elements and compounds you use every day.

14. Suppose you discovered a new element. What might you name it? What might its symbol be?

15. Play a game. Make a separate card for the symbol of each planet. Shuffle the cards and then try to arrange them in alphabetical order, by size or by distance from the sun.

16. Keep a weather chart and use symbols in making the entries.

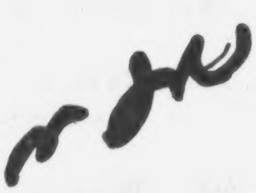
17. Make a rebus using music symbols wherever possible instead of words or parts of words.

18. Make a scale drawing of the house in which you would like to live. Use architectural symbols.

19. Look at some blueprints and identify the various symbols used.

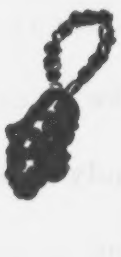
20. Play "Spin the Zodiac". Make a circle of cardboard and divide it into twelve pie-shaped sections. Draw a sign of the zodiac in each section. Make a spinner at the center with a strong piece of cardboard or plactic and a paper brad. Spin to tell your fortune. (Be sure you know the meaning of each symbol.)

21. Make a map of a woodland area. Using the symbols of woodcraft, indicate which trails to follow. See how many of your friends can understand the messages.



22. Write the months of the year using phonetic symbols.

23. Find someone who knows shorthand and ask them to write your name and/or a brief message.



24. Use proof-reading symbols to correct a composition.

25. Get a typing book and copy correctly a short lesson teaching the use of proof-reading symbols.

Lolo Kopa
chickchick
5=a
6=b
7=c

26. Write the names of the U. S. astronauts using diacritical markings.

27. Let each member of the class write a paragraph without punctuation. Trade papers and see how well you can read it the first time. Does punctuation help?

28. Use punctuation to show different meanings of the following sentence: John said Bob hit the dog.

29. Examine some books printed in braille. Try to read them with the help of a braille alphabet.

30. Think of as many signals as you can that are made with the arms and hands (sh-sh, come here, etc.).

31. Practice signals used by bicyclists and car drivers.

32. Play a game like charades using only gestures to indicate the title of a book.

33. Report on petroplyphs found in Oregon.

34. Count to ten in Indian sign language.

35. Make a study of totem poles. Carve one out of balsa wood and explain the symbolism to the class.

36. Compare the Lord's Prayer in Chinook jargon with the English translation.

37. Examine many written codes. Try to find information regarding secret codes used by our government.

38. Make an original secret code.

39. Have a treasure hunt and write your messages in code.

40. Design a piece of jewelry for a professional man using the symbol of his profession.

41. Make a collage of holiday symbols.

42. Study Chinook jargon. (Unit available on request.)

43. Find examples of good luck symbols used throughout the world. Design a good luck symbol of your own.

PEOPLE, PLACES, AND THINGS

Possible areas of interest:

- Place names (states, towns, rivers, streets, etc.)
- Family names

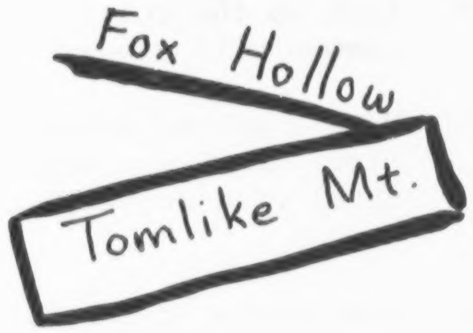
Jones
Smith

- Naming of plants and animals
- Special vocabulary or "jargon" used in various fields of work
- Symbols of advertising, trade marks and automobile crests
- Family coats of arms, crests and monograms

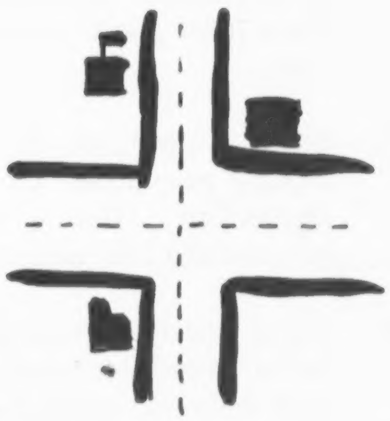
- Names of planets and constellations

Suggested activities:

1. Listen to "The Names of Oregon" from the record The Face of Oregon by OSU. Resource Library



2. Collect maps of various areas of the United States. Do you find names used more than once? Share some colorful place names.
3. Study a city map of Eugene. Is a pattern evident in the naming of streets? Do you know why the streets are named as they are?



4. Interview a man who develops subdivisions to find out how streets are laid out and named.
5. Listen critically to several different news broadcasters. Do they all pronounce words the same?
6. Find out the derivation and meaning of your family name.
7. Trace your family tree and where your family came from. Draw a diagram or a family tree. (See sample form)
8. Report on the study of American place names conducted by the Department of the Interior. (List of publications at the University of Oregon Library.)

9. Compile a list of given names, their meaning and derivation.

10. Report on Linnaeus (Carl von Linne), the father of modern systematic botany.

11. Make a drawing or write a descriptive paragraph describing a new plant or animal. Have classmates decide what to name it.

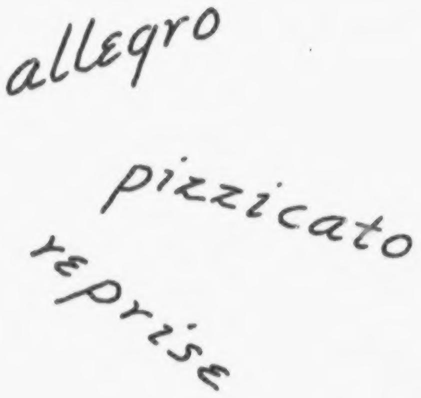
12. Relate the classification of plants and animals by genus and species to the naming of people by surname and first name.

13. Collect newspaper and magazine clippings describing new plants and animals. How were they named?

14. Look up the scientific name of some common wild flowers.

15. Make a poster showing the tree of life (or use a manzanita branch). Label with scientific and common names.

16. Read books or interview people who work in various occupations to find out "jargon" of their trade. Compile a notebook of terms and meanings. Note how each expression came into use.



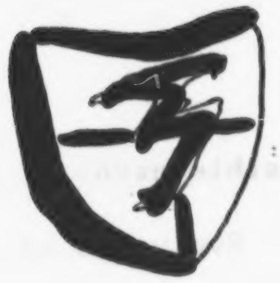
17. Make a cartoon to illustrate terminology peculiar to a particular occupation. Use a caption if necessary to establish meaning.

18. Clip trade marks and advertising symbols from packages or advertisements and make a scrapbook or plan another way to display them.

19. Tear out 15 to 25 advertisements from magazines and remove any wording. Give each member of the class ten minutes to write down as many of the products as they can.

20. Sketch in a notebook the different advertising symbols you see on television during a week's time.

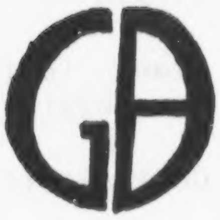
21. Report on the origin and history of trademarks.



22. If you have a family crest or coat of arms tell the class about it.

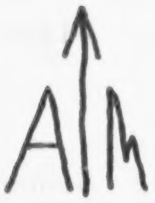
23. Make a collection of coats of arms and crests. Try designing one for your family.

24. Prepare a play about King Arthur. Design a shield with a crest for each knight.



25. Make a study of monograms (shape, styles of lettering, arrangement of initials, use in trademarks, etc.)

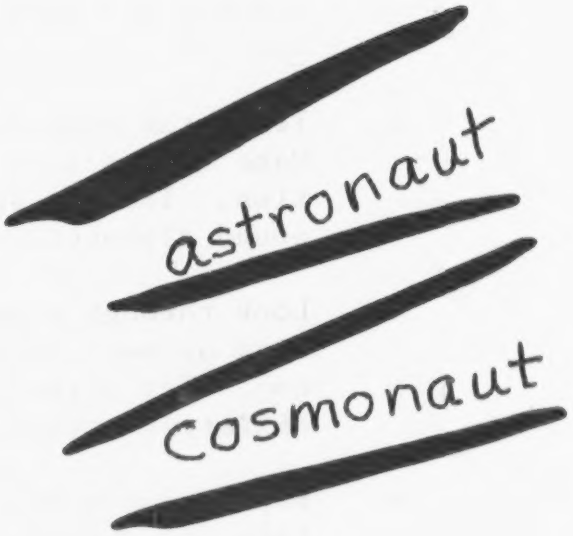
26. Make several different monograms with your own initials.



27. Make a small box of note stationery to give to Mother, a monogram or coat of arms you have designed for her.

28. Look up the derivation and meaning of the names of the planets and constellations.

29. Make a list of new words resulting from advancement in exploration of outer space.

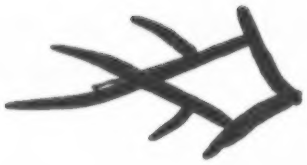


30. Plan a town on Mars. Make a map showing the streets and their names. Where did the people come from? What are their names?

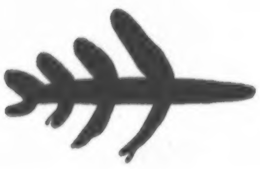
31. Report on why place names are changed and how to change a place name. Most names on the land have been there a long time and many maps use them. Names cannot be changed easily, otherwise confusion would result. Write to the Oregon Historical Society which operates the names board (Oregon Board of Geographic Names) and ask for the form available to those interested in name changes.

KEYS OF MEANING

Possible areas of interest:



- Evolution of our alphabet
- History of the English language



- Origin of our system of numbers
- Slang (origin of words, changes, evaluation)
- Colloquialism and dialect

- Coining of new words and phrases

- Figures of speech (simile, metaphor, irony, personification, hyperhole, understatement, metonymy)
- Synonyms, antonyms and homonyms

Suggested activities:

1. Analyze the letters of our alphabet. How many different movements or strokes are used in writing or printing it?

2. Trace the history of the alphabet. Make a time line showing its evolution. Include the proposed single-sound alphabet.
3. Look through printed materials and find as many styles of type as you can. Try printing your name in some different styles.

4. Experiment with a variety of materials and shapes of letters. (Pieces of bark or wood make interesting letters.) Make a caption for a bulletin board.

5. Study the history of the English language. Plan a bulletin board to show it graphically. (Would a family tree idea be suitable?)
6. Examine books written in different periods. How has our language changed?

7. Compare spelling and wording of Benjamin Franklin's Autobiographical Writings with Nixon's My Six Crises.

8. Secure a copy of Canterbury Tales written in old English. Can you read it? How is it different?

9. Make a chart of prefixes, suffixes and roots used in our language. Show the derivation and meaning of each.

10. Think of some ways to give a concept of number without using numerals.

11. Trace the history of the numerals we use.

12. Compare several systems of numeration. Do you find any ways in which they are similar?

13. Discuss the use of a base other than ten. For instance, what are the advantages and disadventages of working in a base of twelve?

14. Let each student keep a list of slang words while reading a fiction book. (Did you find them all?) Find the average slang words per book.

15. Carry a small notebook with you for a week and write down each slang word or expression you hear. What is the total at the end of the week? Which words or phrases were used most often? Can you organize them in any way?

16. Collect samples of different languages.

17. Listen to records of other languages. Can you hear any familiar words?

18. Read a story about the South. Are there any colloquial words?

19. Think about the dialects in various parts of the United States. How many different ones can you name? Do we have a distinctive way of speaking? Why don't all the people in the United States sound the same? Do other countries have a variety of dialects?

doeth

olde

yonge

sonne

hadde

shielde

BOOK WORM

FAR OUT

G.I.

bug

HOT ROD

off the cuff

DRAG

guy

20. Report on "Pidgin English".

21. What are some new words in our language? How were they formed? (Original words, words formed by converting from one part of speech to another, adding prefixes or suffixes to roots, putting two words together.)

22. List the vocabulary words needed to discuss exploration of outer space. How many of these have been in use less than ten years? How were they formed?

23. Find out why a book of maps is called an atlas.

24. Read "O Captain!" by Walt Whitman. To whom does "captain" refer? What is the "ship"? To what does "voyage closed and done" refer?

25. Look for figures of speech in poems such as Emily Dickinson's "I Tell You How the Sun Rose".

26. The following quotation is from John Adams. It was written just a few days before the First Continental Congress met in Philadelphia in 1774. What does it mean? "May the collision of British flint and American steel produce that spark of liberty which shall illumine the latest posterity..."

27. Find examples of figures of speech in poetry. Why are they used? Can you think of another way to say the same thing?

28. Make similes or metaphors about the wind, the stars, your dog, a ship at sea, etc.

29. Play around with words. Take a simple word like "move" and think of as many synonyms as you can. (Maybe you can coin a few.) Try some antonyms too.

30. Play "Twenty Questions" with homonyms. One person is "It" and leaves the room while the class chooses a set of homonyms (e.g. pear, pare, pair). "It" comes back into the room

housebalus

catchee

puttee book

CUMSHAW

joss-pidgin-man

slick as a whistle

do-due-dew

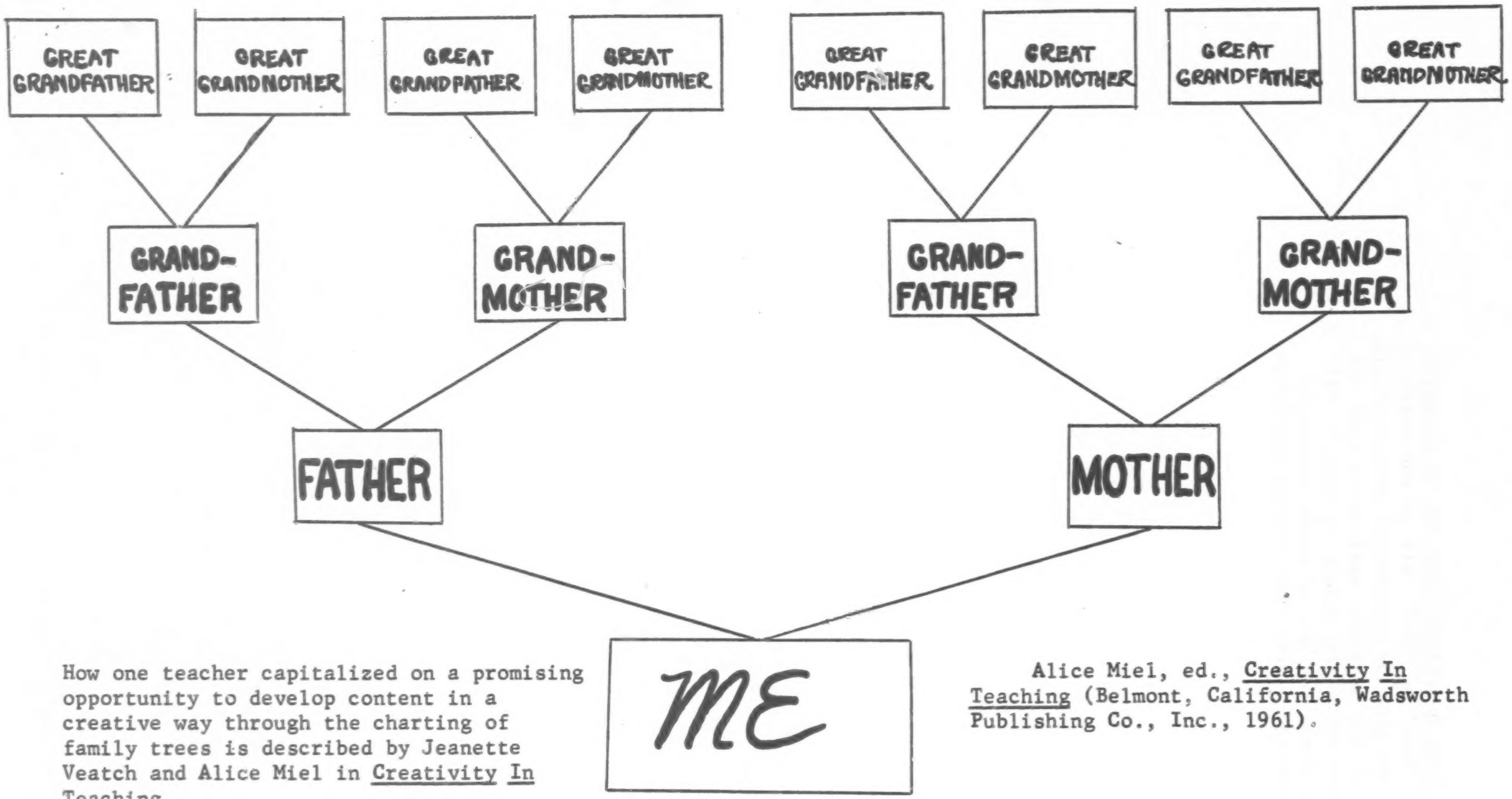
go - come

Sea of glass

SKORT

and asks questions that can be answered with "yes" or "no." All of the words in the set must be considered when replying and if the question applies to even one of the words the answer is "yes." "It" must guess the set of words correctly by asking no more than twenty questions.

MY FAMILY TREE


GREAT GRANDFATHER
GREAT GRANDMOTHER
GREAT GRANDFATHER
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GRAND-FATHER
GRAND-MOTHER
GRAND-FATHER
GRAND-MOTHER
FATHER
MOTHER
ME

How one teacher capitalized on a promising opportunity to develop content in a creative way through the charting of family trees is described by Jeanette Veatch and Alice Miel in Creativity In Teaching.

Alice Miel, ed., Creativity In Teaching (Belmont, California, Wadsworth Publishing Co., Inc., 1961).

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Explores the Greek myths to discover the roots of hundreds of words that have entered into our language, with emphasis on scientific vocabulary.

* ______________, Words of Science, Boston, Houghton Mifflin Co., 1959.

Explores the roots and histories of hundreds of scientific terms. Good index.

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Presents the origins of language, its growth through history and present use. Good reference but difficult.

* Brown, Harriett M., and Guadagnolo, Joseph F., America Is My Country, Boston, Houghton Mifflin Co., 1955, pp. 12-35.

Tells about the symbols of our democracy: flag, seal, etc.

Epstein, Samuel and Beryl, First Book of Codes, New York, Franklin Watts, Inc., 1956.

Codes which have been used through history and codes which are used today as well as invisible inks and how to make up codes.

________________________, First Book of Words: Their Family Histories, New York, Franklin Watts, Inc., 1954.

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Well illustrated handbook of 500 words with a supplementary list of Indian names and totems.

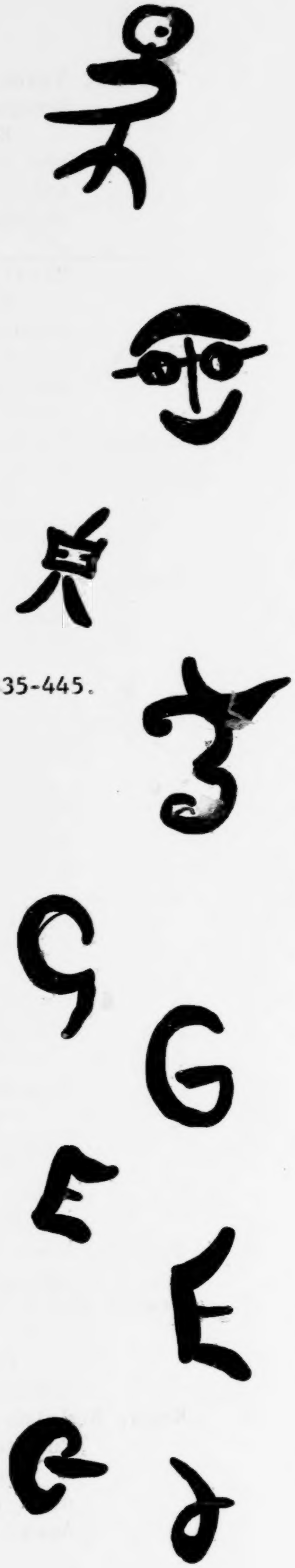
* Hogben, Lancelot, The Wonderful World of Communication, New York, Garden City, 1959.

* Irwin, Keith Gordon, The Romance of Writing, New York, The Viking Press, 1961.

From Egyptian hieroglyphics to modern letters, numbers and signs.

* Koch, Rudolph, The Book of Signs, New York, Dover Publications, Inc., 1961.

Fascinating book containing 493 symbols used from ancient times up to the Middle Ages.



* Laird, Charlton, The Miracle of Language, New York, World Publishing Co., 1953, (also a Premier Book).
The story of our language: What it is, how it began and why we speak as we do. Useful as teacher material.

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The history and roots of language, English in particular, with a short history of printing and instruction on the use of the dictionary.

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History of the English language in terms readily understood by children.

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Almost 200 brief essays explaining American words and phrases.

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2

* O'Donnell, Mable, and Cooper, J. Louis, From Codes to Captain, Evanston, Illinois Row, Peterson and Co., 1960, pp. 15-68.
Deals with various simple codes which children can make and use. Easy, reader-type book.

* Ogg, Oscar, The 26 Letters, New York, The Thomas Y. Crowell Co., 1948.
Traces the evolution of writing from pre-history through our present alphabet.

* Pei, Mario, All About Language, Philadelphia, J. B. Lippincott Co., 1954.
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Development of alphabets and language.

Schweitzer, Paul, and Lee, Donald W., Harbrace Vocabulary Workshop, New York, Harcourt, Brace and Co., 1957.
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* Seaman, N. G., Indian Relics of the Pacific Northwest, Portland, Oregon, Binfords and Mort, 1946, pp. 97-109.
Good section on petroglyphs in this area.

* Shirokov, Felix, "Decoding the Maya Scripts", Science Digest, August, 1962, pp. 4-12.

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* The John C. Winston Co., The Winston Dictionary, advanced edition, Philadelphia, The John C. Winston Co., 1957.
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A history of its origin and its adoption and use by the traders, trappers, pioneers and early settlers of the Northwest coast.

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Has section on Mayan glyphs.

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In addition to the previous units, a unit entitled "The Story of Language" is available on request. Developed by a resource teacher during the summer workshop on Old and New Grammar, it consists of a working outline, with activities and references. Reproduced below are the main topics covered in the outline and some suggested activities.

THE STORY OF LANGUAGE

I. Language is communication
II. Beginnings of language
III. Theories of language origin
IV. Oldest records of written language
V. Language families of the world
VI. History of the Indo-European language family
VII. History of the English language

ACTIVITIES

1. Discover other languages than verbal. (Drum, road signs, flags (including semaphore), trail blazes, deafmute language, mirrors, railroad whistles, codes, etc.)

2. Make up a code.

3. Study the history of our alphabet.

4. Study and learn another alphabet.

5. Make up an alphabet that would make spelling easier.

6. Look for evidence of ancient languages -- Dead Sea scrolls, Egyptian pictographs, Mayan hieroglyphs, Hittites, others.

7. Discover historical or geographical reasons why the people who carried our language parent migrated.

8. Language is a set of symbols. Locate words in our language (of a foreign language) that show this very well. Examples: La plume, French for pen, probably made from a quill; ding-dong, sound like the actual sound.

9. Notice and keep a record of the language of the very young, younger brother and sisters, neighbors, etc. Note some of the principles of language used by these children.

10. Keep a dictionary of slang, or chemistry, or arithmetic, geographic terms, etc. Exchange with other schools.

11. Keep a list of idioms. This could be localized or general, or a time and place in history, as pioneer.

12. Learn the International Phonetic Alphabet.

13. Correspond with children from other countries. Use these letters as a basis for language learning if desired.

14. Follow the controversy over the new Webster's Third International Dictionary. Make up a bibliography of references for other students or teachers to use.

15. Listen to other children of same age for idioms, or slang, or emotional words. Keep a list. Discuss these words for reasons why they are used, meaning or feeling they convey, or any other aspect that comes up.

16. Make up a word of your own. Use it with other children, but do not tell them anything about what you are doing. See how long, if ever, it takes for the word to come into general use, to "catch on". Observe any change in usage -- from noun to verb, verb to noun, etc.

17. Try to discover why languages change; why do some languages die.

18. Keep a list of cognates. (mother, maternal)

19. Make a list of synonyms, antonyms, or homonyms. These can fit a particular area of learning or be of a general nature.

20. Use a word; as jury. Pick out the root. Find other words that come from this root; as jurisdiction, or select a prefix or suffix and do the same.

21. Discover some language peculiarities in different professions or occupations. For instance, what are the origins of many of the words; as in medicine or chemistry or law.

What effect do new inventions or discoveries have on words or language.

23. Make a list of words that are spelled the same but pronounced differently and mean different things.

24. Do a study concerning a coat of arms. Trace your own family name to discover its meaning.

25. Why do we use such expressions as passed away instead of died, intestinal fortitude instead of guts?

26. Talk to persons who have worked in another country.

27. Investigate new language machines. See Scientific American, May, 1962.

28. Find words used in the King James version of the Bible which are now obsolete.

29. Read the autobiography of Helen Keller. Discuss her experiences in learning to communicate.

30. Discover the power and the cruelty in words, their emotional impact. Consider the use of words to make us feel rather than think, as in propaganda, advertisements, commercials, sayings, slogans.

31. Why did man give up gesture, sign, or signal language in favor of spoken language?

32. Make maps showing the location of the nine principal surviving language groups.

33. Discover what you can about the runic alphabet (Old Norse).

34. Trace a word, such as mother, father, brother, water, three, or red, back to its origin. In how many language groups can you find it? What is its origin? What language principles can you discover in the history of the word?

35. What is the origin of some particular gesture or sign? (a handshake, military salute, skull and crossbones for poison, etc.)

36. Could written language, as we know it, or in some future form disappear completely from our world? (Use of television, tapes, recordings, films, dictaphones could make written language unnecessary.)

AN INDUCTIVE APPROACH TO SENTENCE STRUCTURE

This is a fourth grade unit using the inductive approach in a study of sentences. (Teacher made a resolution to mention no grammar terms.)

Goals

To find out what sentences have in common and to explain these similarities in the words of the children.

To make a handbook of these findings.

To become aware of the importance of choosing just the right word.

To deepen interest and appreciation of fine literature.

To establish a clearer idea of what a sentence is and does.

Procedure

Each student brought to class a book that he had read which he felt had examples of good sentences that were well-written and pleasing.

These sentences were placed on the board and were then analyzed by all to try to discover what all sentences have.

Students made a small scrapbook or handbook to be used to record findings and in which to keep their creative writings.

Outline in the Handbook as Expressed by the Children

WHAT SENTENCES SHOULD HAVE

A sentence must tell who and have a doing word.
Examples: Jill ran.

A sentence tells us more when we use a what or where word.
Examples: I like your hair-do. We rode downtown.

Some sentences don't seem to need what or where words.
Examples: She spoke. The door closed.

By adding a how word a sentence becomes more interesting.
Examples: She talked loudly.
Students made lists of "how" words.

Some sentences need when words to make them more interesting.
Examples: I will be there at two. Long ago there were dinosaurs.

Why words make some sentences clearer.
Example: We went to the park to play.

REARRANGING AND CHOOSING WORDS

Words that describe help build better sentences.
Example: A man with a long, silver-gray beard hobbled down the lane.

Sometimes a group of words is used to describe.
Example: The river looked pretty with its sparkling, gurgling water.

It is important to use the word that has just the right meaning.
Children read examples of this from their books.
Poetry was shared.
Roget's Thesaurus was introduced. One boy found a wonderful variety of words for policeman.
Example: The boy yelled, screamed, shrieked, shouted, whined, etc.
Children wrote poetry, paying special attention to choice of words.

Sentences sometimes sound better when they are rearranged.
Study of examples from their books came first.
These were placed on the board by the students.
Example: Off to the woods ran the dogs.
Children wrote paragraphs trying to get variety in sentences.

When sentences have two parts, you need a connecting word.
Example: She played cards, while her brother mowed the lawn.

This is just a beginning, but one both teacher and students seemed to enjoy. How would you do it and where would you go from here?

LITERATURE: A SELECTED BIBLIOGRAPHY

GENERAL

Arbuthnot, May Hill, Time for True Tales and Almost True, Scott Foresman and Co., 1953.

A representative collection of realistic stories for children about:

1. Animals
2. Today in United States
3. Today in Other Lands
4. Historical Fiction and Biography
5. Old Testament Stories

The bibliography by Arbuthnot suggests sources of related literature with age and interest guide on: Negroes, North American Indians, Minority Groups, Mexico and South America, Other Countries and Historical Fiction.

* Blair, Walter, Tall Tale America, E. M. Hale, and Co., Eau Claire, Wisconsin, 1944.

A legendary history of our humorous heroes. The author includes a biographical notebook to help locate further material. This book is about:

1. America Gets Discovered and Settled
2. Captain Storm Along - Clipper Ships
3. Jonathan Slick, Southerners, Dutchmen and Daniel Boone
4. Mike Fink - Mississippi
5. Johnny Appleseed
6. Mose - New York Fireman and California Miner
7. Wind Wagon Smith - Santa Fe Trail
8. Davy Crockett - Settler, Soldier, Statesman
9. Feboldson and Bridger - Western Scientists
10. Paul Bunyan - Lumbering
11. Pecos Bill - Cowboys
12. John Henry - Machines
13. Joe Magarac - Steel
14. Modern Heroes

Carmer, Carl, America Sings, Alfred A. Knopf, Inc., New York, 1942.

Stories and songs of our country's growing about:

1. East 2. Midwest 3. South 4. Far West

Johnson, Sickels and Sayers, Anthology of Children's Literature, 3rd ed., Boston, Houghton, Mifflin Co., 1959.

This reference has an excellent section on myths and legends about:

1. Greek Myths - thirteen selections
2. North American Indian - eight selections
3. Norse - seven selections
4. South American
5. Hawaiian
6. Greek Legends

The section at the back of this anthology suggests an excellent library and literature program about: story telling, history of children's literature, early writings, illustrators and awards.

Graded reading lists with subject interests including: fiction; fables, myths, legends, heroes; sacred; science and nature; biography, travel, history; poetry and biographical sketches.

* Leach, Maria, American Folk Tales and Legends, Cleveland, Ohio, World Pub. Co., 1958.

This collection has short, easy-to-read selections about:

1. Heroes
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3. Bad Men
4. Tall Folk
5. Strange Tales
6. Screams
7. Local Legends
8. North American Indians
9. South American Indians

The bibliography directs one to further material.

* Los Angeles City Schools, Literary Heritage For Children, Los Angeles, Los Angeles City Schools, 1954.

A descriptive list of children's literary classics with primary, middle, upper, and upper-superior ratings about:

1. Inspiration
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4. Poetry
5. Nonsense and Humor
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7. Biography
8. Picture Books
9. Fiction
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* Malcolmson, Anne, Yankee Doodle's Cousins, Boston, Houghton Mifflin Co., 1941.

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Salomon, Julian H., The Book of Indian Crafts and Indian Lore, New York, Harper and Brothers, 1928.

General background material, bibliography for research, Indian vocabulary by regions.

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BIOGRAPHY

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Averill, Esther	King Phillip, The Indian Chief
Baker, Nina	Juarez, Hero of Mexico
	Peter, the Great
	Sir Walter Raleigh
	Big Catalog (Aaron Montgomery Ward)
Beard, Annie S.	Our Foreigh-Born Citizens; What They Have Done for America
	Collection of Short Stories
Becker, May	Introducing Charles Dickens
	Presenting Miss Jane Austin
Benet, Laura	Enchanting Jenny Lind
	The Boy Shelley
	Washington Irving
Benz, Frances	Pasteur, Knight of the Laboratory
Bolton, Sarah Knowles	Lives of Poor Boys Who Become Famous
	Famous Men of Science
Bobbs-Merrill Biography	Series-Childhood of Famous American Series, Easy to read - 60 famous Americans
Bunn, Harriet	Johann Sebastian Bach
Burt, Olive W.	Luther Burbank: Boy Wizard
Cavannah, Frances	Boyhood Adventures of Our Presidents
Clark, Barrett Harper	I-Great Short Biographies of Ancient Times: Middle Ages, and the Renaissance
	II-17th, 18th, 19th Century Biographies
Coblentz, Catherine Cate	Martin and Abraham Lincoln
Commager and Ward	America's Robert E. Lee
* Cousins, Margaret	Ben Franklin of Old Philadelphia

Curie, Eve	Madame Curie
* Daugherty, James	* Abraham Lincoln
	Compares favorably with Sandburg's
	Daniel Boone
	Marcus and Narcissa Whitman
	* Of Courage Undaunted (Lewis and Clark)
Daugherty, Sonia	Ten Brave Men
	Ten Brave Women
d'Aulaire, Ingri and Edgar Parib	Benjamin Franklin
Davis, Julia	No Other White Men: Lewis and Clark
* Eaton, Jeanette	* America's Own Mark Twain
	David Livingstone, Foe of Darkness
	Gandhi, Fighter Without a Sword
	Leader of Destiny: George Washington, Man and Patriot
	Narcissa Whitman: Pioneer of Oregon
	Lone Journey: Life of Roger Clark
	* That Lively Man, Ben Franklin
	Story of Eleanor Roosevelt
	Young Lafayette
Ewen, David	Story of George Gershwin
	Story of Irving Berlin
	Tales from Vienna Woods: Johann Strauss
Fisher, George	The Life of Audubon
* Forbes, Esther	America's Paul Revere
	* Johnny Tremain
* Foster, Genevieve	* Abraham Lincoln: An Initial Biography
	* Abraham Lincoln's World
	* George Washington's World
	* World of Captain John Smith
* Franklin, Benjamin	Autobiography
Freeman, Douglas Southall	Lee of Virginia
Freeman, Mae Blacker	The Story of Albert Einstein
Garst, Doris	Jim Bridger, Greatest of Mountain Men
	Jack London, Magnet for Adventure
* Garst, Shannon	Crazy Horse
	* Joe Meek
Gollomb, Joseph	Albert Schweitzer, Genius of the Jungle
Goss, Madeleine	Beethoven, Master Musician
	* Unfinished Symphony: The Story of Schubert
Graham, Shirley	The Story of Phyllis Wheatley
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Gray Elizabeth Janet	Penn
	Young Walter Scott
Haviland, Virginia	William Penn: Founder and Friend
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Henry, Marguerite	Benjamin West and His Cat, Grimalkin
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* Hunt, Mable Leigh	* Better Known as Johnny Appleseed
	Have You Seen Tom Thumb?
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Ives, Mable Lorenz	He Conquered the Andes, The Story of San Martin

Jackson, Phyllis	Victorian Cinderella; the Story of Harriet B. Stowe
Jewett, Sophie	God's Troubadour, The Story of Saint Francis of Assisi
Judson, Clara Ingram	Abraham Lincoln, Friend of the People
	George Washington, Leader of the People
	Mr. Justice Holmes
	Soldier Doctor, The Story of William Gorgas
	Thomas Jefferson, Champion of the People
Keller, Helen	The Story of My Life
King, Mariam	Elizabeth, the Tudor Princess
* Koch and Peden	The Life and Selected Writings of Thomas Jefferson
Kugelmass, J. Alvin	Ralph J. Bunche, Fighter for Peace
	Louis Braille (windows for the blind)
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	* Galileo
	* Leonardo da Vinci
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* Lisitzky, Genevieve	Thomas Jefferson
Ludwig, Emil	Edison, The Greatest American of the Century
McConnell and Morton, Thompkins	Presidents of the United States
McNeer, May Yonge	John Wesley
Malvern, Gladys	Dancing Star, The Story of Anna Pavlova
Mason, Miriam	Yours With Love, Kate (Kate Douglas Wiggin)
Meigs, Cornelia	Invincible Louisa
* Nolan, Jeanette	Andrew Jackson
	Benedict Arnold: Traitor to his Country
	* Florence Nightingale
	The Story of Clara Barton
Paine, Albert	Boy's Life of Mark Twain
	Girl in White Armor: The True Story of Joan of Arc
Peare, Catherine	Mary McLeod Bethune (Negro Educator)
	Longfellow
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	Mark Twain
Proudfit, Isabel	River Boy, Story of Mark Twain
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* Rosen, Sidney	Galileo and the Magic Numbers
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	Davy Crockett
* Sandburg, Carl	Abe Lincoln Grows Up
* Shippen, Katherine B.	Men of Medicine
Sickels, Eleanor M.	In Calico and Crinoline
	True stories of American Women

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Sperry, Armstrong	The Voyages of Christopher Columbus
Steffens, Lincoln	The Autobiography of Lincoln Steffens (abridged)
Syme, Ronald	Champlain of the St. Lawrence
	La Salle of the Mississippi
	Cortez of Mexico
	Magellan
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	Henry Hudson
	John Smith
Tharp, Louise Hall	A Sounding Trumpet (A biography of Julia Ward Howe)
Vance, Marguerite	Martha, Daughter of Virginia (The Story of North America)
	Patsy Jefferson of Monticello
	Marie Antoinette, Daughter of an Empress
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Waught, Elizabeth	Simon Bolivar
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Wibberley, Leonard	John Barry, Father of the Navy
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Woodham-Smith	Lonely Crusader, the Life of Florence Nightingale
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	A Treasury of New England Folklore
	A Treasury of Southern Folklore
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Bowman, James Lloyd	Pecos Bill, The Greatest Cowboy of all Times
Carmer, Carl	America Sings Stories and Songs of Our Country's Growing
Field, Rachel	American Folk and Fairy Tales
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Henry, O.	The Ransom of Red Chief

Hoffman, Daniel G.	Paul Bunyan, Last of the Frontier Demigods
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Laws, G. Malcolm	Native Folklore Society
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	Part III - Colonies to 75 years ago 1/25/60
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Malcomson, Anne	Yankee Doodle's Cousins
Mellen, Kathleen Dickenson	The Old Folk's Know
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Niggli, Josephina	This Bull Ate Nutmeg (A Mexican Folk Comedy)
Price, Robert	Johnny Appleseed, Man and Myth
Service, Robert W.	The Ballad of Hard-Luck Henry
Twain, Mark	The Celebrated Jumping Frog of Calaveras County
* Wheeler, Post	Hawaiian Wonder Tales

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Borland, Hal	Rocky Mountain Tipi Tales
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Garland, Hamlin	The Book of the American Indian
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Hogner, D. C.	Navaho Winter Nights
de Huff, E. W.	Taytay's Tales
Jaeger, Ellsworth	Wildwood Wisdom
Johnson, Sickels, Sayers	Anthology of Children's Literature
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Marriott, A. L.	Winter - Telling Stories
* Martin, Frances Gardiner	Nine Tales of the Raven and Nine Tales of Coyote
Nusbaum, A.	The Seven Cities of Cibola
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Parker, Arthur C.	Skunny Wundy
Penny, Grace Jackson	Tales of the Cheyennes
Pinkerton, K. S.	Hidden Harbor
	Tlingit Stories
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Swanton, John R.	Myths and Tales of Southeastern Indians
	Tlingit Myths and Legends
Thompson, Edward	Invocation of the Rain God (Yucatan-Mexico)
Tunis, Edwin	Indians
Watson, K. W.	Tales for Telling
Wilson, Gilbert	Indian Hero Tales

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Brenner, Anita	Boy Who Could Do Anything and Other Mexican Folk Tales - 24 tales of Mexican folklore.

Bryan, Catherine and Madden, Mabra	The Cactus Fence (Mexican Folk Tales)
Eells, Elsie Spicer	Tales from the Amazon
Finger, Charles	Tales from Silver Lands (South America)
Frost, Frances	Legends of the United Nations Several legends of Latin America are included.
Henius, Frank	Stories from the Americas Stories from 20 of the American Republics.
* Jagendorf and Boggs	The King of the Mountains: A Treasury of Latin American Folk Stories Fifty stories from Mexico to Chile.
* Pan American Union	Folk Songs and Stories of the Americas
* UNICEF	Hi Neighbor, Books, I, II, III Fun and folklore from five countries.

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Buckley, Elsie	Children of the Dawn Old Tales of Greece
Bulfinch, Thomas	Mythology: The Age of the Fable; The Age of Chivalry; Legends of Charlemagne A Book of Myths
Colum, Padraic	The Forge In the Forest (Greek myths) Golden Fleece and the Heroes Who Lived before Achilles
Galt, Thomas	The Rise of the Thunderer Modernized version-authentic Greek myths.
Gibson, Katherine	The Golden Bird and Other Stories Legends from Egypt, Persia, China, Greece.
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The Arts

Art, Music and Literature

* THE ARTS AND THE OREGON PIONEERS

* THE CHARACTER OF EARLY AMERICAN CULTURE

* LATIN AMERICAN AND NORTH AMERICAN CULTURE:

Contrasts and Similarities

CREATIVE ARTS AND CRAFTS

THE ARTIST AND HIS PROBLEM

* This three-fold resource unit is suggested as a starting point for the enrichment of the fourth, fifth, and sixth grade social living units. Because of the breadth of these chosen areas, only one facet of the problem has been chosen for each grade level.

I. THE ARTS AND THE OREGON PIONEERS

We may think of this period as extending from 1830, with the coming of the first settlers, to 1883 which saw the completion of the first transcontinental railroad. Although the life of the pioneer was a rugged one leaving little time or inclination for such niceties as art, music, and literature, it is true that some facets of the arts developed early and played a really important role in the lives of these people. Here as elsewhere people innately cultivated the beautiful as a necessary part of a happy life. Women showed off their patchwork quilts and men of necessity shaped well-designed farm and carriage tools.

A. Antiques

1. Possible aspects and activities
    - a. What articles were saved and why?
      A visit to the Pioneer Museum and to other museums in the state will provide part of the answer.
    - b. Discuss the art qualities of these articles as to shape, color, design, function. Draw sketches of them; bring in pictures of them for a bulletin board; make a display of some unbreakable items in the classroom.
    - c. How would a pioneer home look as compared to one today?
      Robert Carlton Clark gives us a picture of pioneer life in his book, Willamette Valley, Oregon, Volume I (S. J. Clarke Publishing Company, 1927.) He says that the people of the Willamette Valley were of three groups: the French Canadians of the Hudson Bay Company, the trappers or Mountain Men, and the familiar American pioneers. Most pioneer homes had a few prized possessions: a piece of furniture, a book or two, the Bible; objects painfully carted across the plains. On the walls hung a few cheap prints and adding spots of color and beauty were the patched quilts of the housewife. This home contained no magazines or newspapers and few school books but almost always a hymnal and a Bible.[1]
    - d. How were these articles made and where did they come from?
        - .Discuss the journeys across the plains and around the Horn. Make diaries or write stories of possible adventures in bringing these objects to Oregon.
        - .Find out who made such things as cobbler's tools, farm tools, butter molds, churns, kettles, horse shoes, stools, tables, and other necessary items.
        - .Try to make a model of an old sideboard, desk, wooden scythe, chest or churn using cardboard or balsa wood and glue.
        - .Make a seed picture using natural materials.
        - .Make a small patchwork quilt for a baby and give it to the Red Cross.
        - .Visit the Oregon Room at the University to study old diaries, letters and books.

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[1] Robert Carlton Clark, Willamette Valley, Oregon, Vol. I (Chicago, Ill., S.J. Clarke Publishing Co., 1927).

- .Make a simple tool out of wood such as a spoon. Finish and polish it.
- .Sketch an old house or building in Eugene.
- .Embroider a child's sampler to learn various stitches.
- .Learn all you can about antique dealers and their wares today. What do they consider valuable?
- .Try to find an older person who lived as a pioneer in Oregon, to talk to the class.
- .Go to the Pioneer Museum and measure out a covered wagon to plan where all supplies would be put.
- .Study the dress of the pioneers. How did the dress of the trappers differ from that of the pioneers?
- .What Oregon raw materials did they use to make things? What could you make?

2. Selected books (by Mrs. Foss of the Lane County Pioneer Museum).

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Peterson, Harold, American Knives, N.Y., Charles Scribner's Sons, 1958.

B. Music and the Oregon Pioneers

Most all experts agree that music was important on the Oregon Trail and in the early settlements. However, it was mainly a transplanted music and not original. "O Susannah" was a great favorite with the thousands who started out from Independence bound for Oregon. Storytelling and singing helped to lighten loads and to pass the time on the long journeys. There was usually a fiddler in each group who could charm the most footsore with a lively "Turkey in the Straw" at the end of the day. The earliest form of instrumental music was the brass band and most early communities boasted a lively one. Other typical musical groups were singing schools, groups of adults and children who met weekly to sing and prepare programs for favorite community holidays such as the Fourth of July. Portland organized the first orchestral group in 1875 which consisted of 5 violins, 2 double-bass, 1 trombone, 1 pianist, and a director. It was called the Amateur Musical Society. The first Symphony Society in the far West was organized in Seattle in 1907.

1. Possible aspects and activities
    a. Find out from older residents about early music in Oregon.
       Did they sing only sad songs? What were their songs about?
    b. Kinds of songs that were enjoyed at this time.
       Look through many songbooks and find some examples of hymns and religious songs the pioneers might have sung.
       Can you find any political songs and marches that they might have liked? Why?
       Prepare a program of these songs that you have found and learned.
       Make up the words and music to a song that might be sung on the Oregon Trail.
    c. Out of scraps of material you can gather together make some simple musical instruments that can be played while you sing.
    d. Write a short play portraying an old church service or a square dance using typical music.
       Put on this play for another room.
    e. Discuss the changes that have taken place in music of 1850 to 1962. What do you think music will be like in 1990?
    f. Make up some street cries such as: Junk man; bottles and rags! Junk man; bottles and rags!
    g. Singing schools were very popular with the Oregon pioneers. Organize one in your school and prepare a program for parents.
    h. Find out what holidays were important to the pioneers. Discuss what happened on these holidays. Using a cardboard box make a scene showing one of these holidays.
    i. Before the time of the Pure Food and Drug Laws, the traveling Medicine Man pulled into town, gave a show and then sold his version of Tiger Fat which cured everything. One reference gives the ingredients of this cure-all as being vaseline, camphor, menthol, eucalyptus, turpentine, oil of wintergreen and paraffin. Put on a Medicine Man Show for your class.
    j. Make up a skit showing how music helped the Oregon pioneers through many hardships.
    k. Learn two or three Western folk and square dances.

2. Selected books

Allyn & Bacon, Inc., This Is Music, Book 5, Boston, Mass., Allyn & Bacon, Inc., 1961.

Boni, Margaret, Fireside Book of Folk Songs, New York, Simon and Schuster, Inc., Pub., 1947.
Available in the Music Office. The songs are here and the background material for each.

Carmer, Carol, America Sings, Stories and Songs of Our Country's Growing, N.Y., Alfred A. Knopf, Inc., 1942.
Available in the Music Office.

Silver Burdett Co., Music for Living in Our Country, Book 5,

C. Literature and the Oregon Pioneers

As we discovered with music, much of the reading matter of the Oregon pioneers was brought from the East. On the tedious and often perilous trip across the plains, books were stuffed between boards and in every available cranny. They arrived water-soaked, dirty, and torn but still treasured. The Spaldings are said to have collected the first library of the Northwest in 1839. Dr. McLoughlin left no record of a library, but the trappers with whom he worked dearly loved to tell stories. Many a tall tale originated and blossomed here. Added to these were the accounts of the explorers and of the missionaries. The pioneers soon showed that they had much to say. The first newspaper, The Oregon Spectator, was published in 1846 in Oregon City. Other papers like the Western Star and The Oregonian soon followed. Politicians' speeches could then be printed and read by many. Oregon's first novel, Prairie Flower by Sidney Moss came out in 1849. Bookstores appeared and sold classics such as Shakespeare and Shelley. A report from the Portland library in 1868 showed that favorite books were romances, melodramas, sea stories, and classics such as David Copperfield, Ivanhoe, Scarlet Letter, Ben Hur, David Harum, and Ben Holden. Drama was important and was brought to towns by traveling actors. There were no women actresses. Stage manners and clothes were very stereotyped. Traveling concert artists and lecturers also brought culture in varying degrees as early as 1849.

1. Possible aspects and activities
    a. Collect as many old books and textbooks as you can. Examine these carefully to see what readings and selections of poetry are there. Who were the favorite poets of the Oregon pioneers?
    Read a number of poems by such American poets as Whittier, Longfellow, Lowell and others and then pick one to memorize. In the manner of old-time school programs, give your selections for some other group.
    b. Make up a tall tale that might be told by a French Canadian trapper of the Willamette Valley.
    c. Do some role-playing. You are a group of trappers sitting around the fire at the end of the day. What do you talk about? What happened on your last hunting trip?
    d. Find out as much as you can about the kinds of occasions when whole communities or many families came together: Fourth of July picnics, spelling bees and singing schools at the schoolhouse, weddings, ball games, horse races, quilting bees, house raisings. Were they more dependent or less dependent on one another than people are today? Give reasons for your answer. Have a class discussion.
    e. Have a panel discussion on the kind and the amount of reading material in the Oregon pioneer homes and the kind and the amount found in our homes today.
    f. Form a committee and make up a melodrama to be presented to an audience.
    g. Try to find out how people's taste in literature has changed from 1850 to now.
    h. Dress up as characters from the literature of this period and let the class guess who you are.

2. Selected Books

Clark, Ella E., Indian Legends of the Pacific Northwest, Berkeley, Calif., University of California Press, 1953.

Many of these interesting legends were recorded by pioneers. Included are the legends of the Origin of Crater Lake, The Three Sisters, and The Bridge of the Gods.

Life Magazine, ed., American Folklore, Five-part series, N.Y., Time, Inc., 1959 and 1960.

Part IV Legendary Feats of the Pioneers, Part V Ballads and Tales of the Frontier.

Powers, Alfred, History of Oregon Literature, Portland, Ore., Metropolitan Press, 1935.

Available in the Oregon Room of the University of Oregon, 810.9, not circulated. A good teacher reference.

Warren, Sidney, Farthest Frontier, N.Y., Macmillan Co., 1949.

Available in the Oregon Room of the University of Oregon, 979.5. An excellent teacher reference.

3. Museums of Oregon

Astoria - Flavel Mansion, Historical Museum
Brownsville - Historical Museum
Canyon City - Joaquin Miller Cabin
Champoeg - Champoeg State Park; Pioneer Mothers' Home and Pioneer Home
Coquille - Pioneer Museum
Corvallis - Horner Museum, Oregon State University
Eugene - Lane County Pioneer Museum
Jacksonville - Historic Museum, old court house
Klamath Falls - Klamath County Museum
Newberg - Minthorn House
North Bend - Coos and Curry County Museum
Oregon City - McLoughlin House
Portland - Oregon Historical Society
Roseburg - Governor Lane House
The Dalles - Surgeon's Quarters, Fort Dalles
Tillamook - Tillamook County Pioneer Museum

II. THE CHARACTER OF EARLY AMERICAN CULTURE

As soon as frontiersmen settled down with a permanent home and a family, they began to beautify their surroundings; a bit of needlework on a coverlet of a bed, an embroidered hanging, a painted design on a breadboard. Thus, in spite of the strictness and inflexibility of the religion of many New Englanders, certain kinds of art, music and literature began to be developed and in the doing was laid the foundation for a culture of American character. It was a conjunctive one, drawing from many nationalities and many backgrounds, and it developed slowly;--first by simply copying former styles and patterns from previous cultures and then reordering and reconstructing to suit the simple tastes of the life in the new land.

A. Early American Art

It was in the crafts that America achieved its finest art of this period. Most of these were born and developed out of necessity, and because of lack of time, achieved a simplicity that became an enduring American quality. The bowls, kitchen utensils, and tools carved by many unskilled colonists were simple and well-adapted to the use to which they would be put; Paul Revere's silver pieces were achievements in elementary design. As prosperity increased, limners (from medieval illuminating of manuscripts), unschooled and self-taught, traveled about painting portraits and supplying the many signs and trade symbols demanded by shopkeepers.

According to Mrs. Carrie A. Hall in The Romance of the Patchwork Quilt, the slow changing of our social patterns has been recorded in many ways, but no one product has so closely reflected the folkways of some portions of American life as has the patchwork quilt. Although quilt making is one of the world's oldest arts, the pieced quilt is our own American production. The patchwork quilt, as such, has come to be a distinctly American art form, indigenous to our native soil and well imbedded in the background of our national consciousness. It has played a part in the history of our nation, and many interesting aspects of early American history are reflected in its development. Needlework was the one art which women could claim as their own. In every household, rich or poor, women sewed; the rich had their silks and embroideries; the poor the more practical art of making their own clothes and household supplies. Even those who had means must think of necessities, and in a large family the ever increasing demand for bed quilts, so essential to their comfort, made them the universal form of needlework prior to 1750. In mansion house or frontier cabin, every scrap was saved for the quilt making.[1]

In speaking of decorative stitchery and embroidery, Georgiana Brown Harbeson in her book on American needlework says that the uses to which embroidery was applied reflect the taste, manners, and customs of the changing cycles of the American scene. Being a purely interpretative medium, this needlework was very often the means of poetic and philosopic release of countless numbers of women who had no other outlet for their idealistic feeling during the pioneer days and throughout the cultural evolution of a vast, growing country. An appreciation of American needlework may become a reminder of the importance American women of the past placed upon the value of good craftsmanship as an aid to better living, through stitchery.[1]

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[1] Carrie A. Hall and Rose G. Kretsinger, The Romance of the Patchwork Quilt (New York, Crown Pub., Inc., 1935).

1. Possible aspects and activities
   a. Investigate the sources of the materials from which their arts and crafts came.
   What did they make from clay, flax, wool, straw, iron, stone, wood, tin, cloth scraps, rags, paper?
   What could you make from the raw materials around you?
   Experiment with homemade dyes. The colonial housewife used butternut hulls for brown, powdered indigo for blue, indigo and goldenrod for green, ground madder root for reds and browns, onion skins for yellow.
   b. Why was the fact that Early Americans had to develop resourcefulness and self-sufficiency important in making our country great?
   Do some role-playing. What would your life be like without stores and places to buy needed supplies? Write a story telling about your experiences in a cabin far from civilization.
   c. Learn as much as you can from reference books about Early American crafts such as: furniture, (American Windsor Chair and Chinese Chippendale); toleware (painted tin); pottery; powter (tin with copper or lead); glass (Henry Stiegel's glass and Sandwich glass); American stage coaches (built for speed not comfort); American clocks (handsome and in quantity); steamboats (Robert Fulton, 1807) and American ships.
   d. During and after the American Revolution people were intensely patriotic and art products showing national emblems and symbols were much in demand. Design some emblems and symbols using cardboard, wood, aluminum foil, and other materials to be hung on the wall or over a doorway.
   e. See what you can find out about the 'Banjo Clock' of Simon Willard. It was designed in 1802 and became very popular for public buildings such as schools and for homes. Try to find one to bring in to show the class. America can be proud of its clockmakers. Can you find the names of any other men skilled in this craft? (Benjamin Franklin, David Rittenhouse and Matthais Baldwin.) Find an old discarded clock and show the class how it works.
   f. Other topics that would make interesting reports are guns, stamps, coins, buttons, dolls.
   g. Discuss the various groups and nationalities that made up the population of the new country and try to find the contribution of each to an American art. (Indians, Portuguese, others.)
   h. A North Carolina preacher of Colonial days wrote: Men are generally of all trades, and women the like within their spheres... Men are generally carpenters, joiners, wheelwrights, coopers, butchers, tanners, shoemakers, tallow-chandlers,

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[1] Georgiana Brown Harbeson, American Needlework (New York, Crown Pub., Inc., 1938).

watermen and what not; women soapmakers, starch makers, dyers etc. He or she who cannot do all these things -- will have a bad time of it.[1] How is life different in America today? Which do you think makes the better life?

i. Find out from reference books what kinds of houses and buildings the colonists built. Did they copy from Europe or develop a style of their own? Study our United States capitol and the White House. What kind of architecture is it?

j. See if you can find out what stores of long ago were like. Make a replica of one from a cardboard box. Sugar, salt, peanut butter, flour and rice were kept in barrels. Carpetbags, men's vests, and drugs such as pain killer, blood purifier, pleurisy root, and kidney wort tablets were sold. There were always several chairs and a table with a checkerboard so men could drop in for a game and some conversation.

k. Learn about different kinds of patchwork quilts; pieced quilts; the appliquéd, patched, or "laid-on" quilts; and the quilted counterpanes. Find out how quilt patterns were named. Make a quilt design and name it. Learn about the quilting bee. Find out what was the quilt's place in art.

l. Some of our best early American painters were Benjamin West (1738-1820), Gilbert Stuart (1755-1828), John Trumbull (1756-1843), Samuel F. B. Morse (1791-1872), John Vanderlyn (1775-1852), Rembrandt Peale (1778-1860), and Thomas Sully (1783-1872). Our first great sculptor was William Rush (1756-1833). See if you can find prints of any of their work.

2. Selected Books

* American Heritage Publishing Co., American Heritage, New York, American Heritage Pub., Co., 1960, 1961.
Each number contains at least one article on early American art.

Bricker, William Paul, Complete Book of Collecting Hobbies, New York, Sheridan House, Inc., 1951.
A good source book giving history, interesting facts, and many pictures.

Christiansen, Erwin O., The Index of American Design, New York, The Macmillan Co., 1950.

* Eaton, Allen H., Handicrafts of New England, New York, Harper and Bros., 1949.
Excellent source of crafts practices in the New England states.

* Eckhardt, George H., Pennsylvania Clocks and Clockmakers, New York, Crown Pub., Inc., 1955.
This edition was published by Bonanza Books. An epic of early American science, industry, and craftsmanship.

Eliot, Alexander, ed., Three Hundred Years of American Painting, N.Y., Time Inc., 1957.

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[1] Life Magazine, ed., "America's Arts and Skills" (New York, E. P. Dutton and Co., Inc., 1957), Part I.

This presentation of American paintings reflects American life. Brief stories of the most important artists are included.

Flexner, James Thomas, The Pocket History of American Painting, New York, Pocket Books, Inc., 1957.

* Hall, Carrie A., and Kretsinger, Rose G., The Romance of the Patchwork Quilt, New York, Crown Pub., Inc., 1935.

This edition was published by Bonanza Books. History and quilt patches; quilts - antique and modern; quilting and quilting designs.

* Harbeson, Georgiana Brown, American Needlework, New York, Crown Pub., Inc., 1938.

This edition was published by Bonanza Books. The history of decorative stitchery and embroidery from the late sixteenth century to the twentieth century.

Lichter, Frances, Folk Art of Rural Pennsylvania, New York, Charles Scribner's Sons, 1946.

University of Oregon Library, 709.748.

Life Magazine, Ed., America's Arts and Skills, New York, E. P. Dutton and Co., Inc., 1957.

America's artistic tradition is shown in colorful illustrations and interesting text. The book includes reproductions of art objects, tools, furniture, houses and other things from the time of the early colonists to the present. This series of articles from Life are available in the Art Office.

Saint-Gaudens, Homer, The American Artist and His Times, New York, Dodd, Mead and Co., Inc., 1941.

Available in the Art Office.

Yates, Raymond F., and Marguerite W., Early American Crafts and Hobbies, New York, Wilfred Funk, Inc., 1954.

Early American skills in handicrafts that were popular during the colonial period are described here. Complete instructions and explanation of techniques are given. The practical information about how to do things can be used for the classroom.

B. Early American Music

John Steinbeck in American Folk Songs of Protest by John Greenway has this to say about songs of the people:

> The songs of the working people have always been their sharpest statement, and the one statement that cannot be destroyed. You can burn books, buy newspapers, you can guard against handbills and pamphlets, but you cannot prevent singing.
>
> For some reason it has always been lightly thought that singing people are happy people. Nothing could be more untrue. The greatest and most enduring songs are wrung from unhappy people--the spirituals of the slaves which say in effect--"It is hopeless here, maybe in heaven it will be better."
>
> Songs are the statement of a people. You can learn more about people by listening to their songs than any other way, for into the songs go all the hopes and hurts, the angers, fears, the wants and

aspirations.[1]

1. Possible aspects and activities
    a. At first each group of settlers from the Old World tried to imitate in all aspects the community they had left in Europe. It was not long, however, before Yankee ingenuity and resourcefulness began to create a music of American character. It is interesting to try to find out the sources of culture that contributed to this music. Alan Lomax in his book, Folk Songs of North America, suggests that two principal traditions gave rise to our hybrid music, British and West African.[2]
    Make a list of other contributors such as gypsies, Dutch, Swedish, Indians, Spanish, Chinese, Japanese, French and others.
    Find songs from other countries which we have adopted and sung in America.
    b. Do you agree with Alan Lomax that in the American folk song the individual is everything - his joys, sorrows, and dreams? See if you can find songs that substantiate this belief. Experts have called Americans the greatest travelers in the world. Alan Lomax says this "movin habit" gave Americans a restless, lonesome feeling. Can you think of songs that reflect this idea? Learn some of them and work out a program for the class.
    c. The New England Puritans and Pilgrims established a culture pattern that has greatly influenced all of the American arts. They felt that pleasure was wrong; that music and art should not be enjoyed; that the use of instruments and dance were not to be tolerated; that man was on this earth to be sober and hard-working.
    Can you find some of the early hymns sung by the strict New England colonists?
    d. Elie Seigmeister in his book, Work and Sing, said that people building America worked so hard they had to sing.[3] Here are a few of the songs listed in his book. How many of these do you know? Rio Grande, Shenandoah, The Big Corral, Goodbye Old Paint, Night Herding Song, Boatman's Song, Do-da Day, Drill, Ye Tarriers, Drill. What would be a good song for this year? One about space? About camping and being out-of-doors? Why not make up one?
    e. In Early America there was little group singing and this of low quality and enthusiasm. People more often listened to solo voices. It took the negroes to teach us how to sing in groups, joyously and freely. The negroes often had a leader who sang a line and a chorus who took it from there

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[1] John Greenway, American Folksongs of Protest (Philadelphia, University of Pennsylvania Press, 1953).

[2] Alan Lomax, The Folk Songs of North America, (New York, Doubleday and Co., Inc., 1960).

[3] Elie Siegmeister, Work and Sing (New York, Edward B. Marks Music Corp., 1953).

and then handed it back to the leader. Songs were often made up extemporaneously to suit the time and the occasion. Form a committee to try making up a song about something that is happening in your school or your city.
The "singing school" movement grew more popular out of the cities and in the West and our early Oregon history is full of accounts of this musical activity.

f. Learn the verses of "Yankee Doodle." What does it tell you about the American Revolution? Puritan stock developed the Yankee, full of curiosity and enterprise. What made him develop these traits, do you think?
g. Folk songs are expressions of feeling. Look through a number of song books and make a list of them telling the kind of feeling in each one.
h. What are some of the early dances enjoyed by some groups in America? Try them out in your room.
i. Captain Kidd sailed the Atlantic and left countless treasure all along the Atlantic Coast. He finally met his end in London in 1701. Make a treasure map of his exploits. Make up a sea chant to go along with the map.

2. Selected books

Allyn and Bacon, Inc., This Is Music, Book 5, Boston, Mass., Allyn & Bacon, Inc., 1961.
Many songs of America's growing. Available in the Music Office.

Basic Record Library, Book 5, R.C.A. Victor Records. This volume contains many folk tunes.

Boni, Margaret, Fireside Book of Folk Songs, New York, Simon & Schuster, Inc., Pub., 1947.
An excellent source. Available in the Music Office.

Browne, C. A., The Story of Our National Ballads New York, Thomas Y. Crowell Co., 1919.
Available in the Music Office. All about "Yankee Doodle," "America," "Dixie," and others.

Carmer, Carl, America Sings, Stories and Songs of Our Country's Growing, New York, Alfred A. Knopf, Inc., 1942.

Greenway, John, American Folksongs of Protest, Philadelphia, University of Pennsylvania Press, 1953.
Available in the University of Oregon Library, 784.4. The reason why songs are written: politics, work, protest, lamentation.

Housman, Ruth L., Sing and Dance With the Pennsylvania Dutch, New York, Edward B. Marks Music Corp., 1953.
An interesting collection of Amish music such as: "Now Thank We All Our God," "Skip to My Lou," "Bingo," "Johnny Schmoker," "Sleep, Little One, Sleep."

Kinscella, Gertrude, History Sings, Lincoln, Nebraska, University Pub. Co., 1940.

Lomax, Alan, The Folk Songs of North America, New York, Doubleday and Co., Inc., 1960.
A good teacher's reference giving words, music, and origins of over 300 folk songs, old time favorites, authentic chants, ballads, work songs, and spirituals.

Sieger, Ruth Crawford, American Folk Songs for Children, New York, Doubleday and Co., Inc., 1948.
Folk songs by states. Available in the Music Office.

Siegmeister, Elie, *Work and Sing, A Collection of Songs That Helped Build America*, New York, Edward B. Marks Music Corp., 1953.
Available in the Music Office.

Silver Burdett Co., *Music Around the World*, *Music for Living In Our Country*, and *Music Near and Far*, *Teachers' Ed.*, Morristown, N. J., Silver Burdett Co., 1956.
Available in the Music Office.

Tooze, Ruth, and Krone, Beatrice, *Literature and Music as Resources for Social Studies*, Englewood Cliffs, N. J., Prentice-Hall, Inc., 1955.

Wolfe, Irving, Krone, Beatrice, and Fullerton, Margaret, *Music Across Our Country*, Chicago, Ill., Follett Pub. Co., 1959.

______, *Voices of America*, Chicago, Ill., Follett Pub. Co., 1960.

C. Early American Literature

The first 200 years of our history produced little that is considered great as artistic literature. There are many reasons for this. The colonists were busy making a way of life in the new land. New Englanders, sober and hard-working, read their Bible, their almanac, and little else. Imaginative writings such as fiction and poetry were considered much too worldly. Settled mainly by dissenters, the colonies were full of prejudice and intolerance and it was only after using their combined efforts to solve common and difficult problems that they could present a united front. Thus, it is not surprising that literature did not flower in this country until the beginning of the 19th century. From this time on America produced many writers of international merit.

1. Possible aspects and activities
   a. The earliest writings in America may be thought of as descriptive prose. The New World was of great interest to everyone so it was natural that men should record descriptions and experiences.
   Captain John Smith (1579-1631) and William Bradford (1588-1657) have provided us with readable and straightforward accounts of their colonies. Pretend you are going to a new land and feel it is your duty to keep a record of the land, the people, and your experiences there.

   b. Probably the best-known literary figure of Colonial times is Benjamin Franklin (1706-1790). His *Autobiography* is a true classic and is still used today as a model for this kind of writing. It has a gentle charm, showing the sober judgment and the wit of this great man.
   After you have read parts of it, write your own autobiography. See if you can figure out what Benjamin Franklin's goals in life were. What are your goals?

   c. By 1760 the colonies had a population of about 1,600,000, of which about two-thirds were native-born Americans. As the colonists became more and more excited about the cause of liberty and freedom, we enter a period filled with political prose. At this time no man had a greater reading public than Thomas Paine (1737-1809). His *Common Sense* published in 1776 advocated a complete break with England and greatly helped the American cause. Imagine that you are a newspaper editor in 1776 or 1777 when the American cause was going badly.

Write an editorial to encourage the Yankees in their fight.

d. Thomas Jefferson (1735-1826), a great scholar, is credited with the writing of the Declaration of Independence which is regarded as a great literary accomplishment. Take turns reading it in your class. Imagine you are living at that time. Do some role playing as you try to decide how you feel about the Revolution and what you will do about it.

e. By 1810 America could turn its attention to more cultural matters and there comes a great stride forward in education, in the publication of newspapers, magazines and books and in the arts. It is interesting to see the number of literary men produced in the first years of the 19th century. Birthdates and men follow:

1783 Washington Irving
1789 James Fenimore Cooper
1794 William Cullen Bryant
1796 William H. Prescott
1800 George Bancroft
1803 Ralph Waldo Emerson
1804 Nathaniel Hawthorne
1807 Henry Wadsworth Longfellow
1807 James Greenleaf Whittier
1809 Oliver Wendell Holmes
1809 Edgar Allen Poe
1812 Harriet Beecher Stowe
1817 Henry David Thoreau
1819 James Russel Lowell
1819 Walt Whitman
1819 Herman Melville

See if you can find some literary works of these men and then share them with others in the class.

Decide which author you like the best and tell why you have made this decision.

Write a short story or a poem about something you have observed.

2. Selected Books

Arbuthnot, May Hill, Children And Books, Chicago, Scott, Foresman and Co., 1947.
Biography p. 527-538.

Carmer, Carl, American Folklore and Its Old World Beginnings, Reprint from Compton's Encyclopedia.

* Leach, Maria, The Rainbow Book of American Folk Tales and Legends, New York, The World Publishing Co., 1958.
Excellent source on state lore as well as legendary heroes, bad men, and popular tales.

* Life Magazine, "Folklore of America" Part I, Early Legends of Exploration; Part II, Indians; Part III, Colonists; Part IV, Pioneers; Part V, Frontier.
Background material and pictures.

North, Sterling, Thoreau of Walden Pond, Boston, Houghton Mifflin Co., 1959.
This is a very readable account of Thoreau's life at Walden Pond, his love of nature, animals, and human friends.

Sechrist, Elizabeth Hough, One Thousand Poems for Children, Philadelphia, Macrae Smith Co., 1946.
Here are many poems by early 19th century American poets.

Seton, Anya, Washington Irving, Boston, Houghton Mifflin Co., 1960.
This book is fascinating reading about one of America's greatest writers and diplomats. Accounts of Irving's friendships with many famous people of his time are given.

Smith, Guy E., American Literature, Ames, Iowa, Littlefield, Adams and Co., 1960.
A paperback with much readable information.

Tooze, Ruth, and Krone, Beatrice, Literature and Music as Resources for Social Studies, Englewood Cliffs, N. J., Prentice-Hall, Inc., 1955.
Much help in correlating literature and music with social studies.

* Wheeler, Post, Hawaiian Wonder Tales, New York, The Buchhurst Press, 1953.
Exciting and wonderful tales.

III. LATIN AMERICAN AND NORTH AMERICAN CULTURE: Contrasts and Similarities

When Columbus landed in the New World in the 15th century he had no way of viewing all of North and South America, but scholars since then have estimated that when he landed there were about one million Indians North of the Rio Grande, about three million in Middle America and about nine million in South America, all of the same general racial stock. At that time the most highly developed cultures, the Aztecs, Mayas, and the Incas, excelled in many ways that of the Spanish who conquered them, especially in the fields of mathematics, science and astronomy. Because their philosophical ideas were in many ways similar to that of their white conquerors, and because of the tolerance of the Spanish toward the native culture, it was possible for them to retain much of their own culture while merging with the new. In contrast to this pattern, the white man in North America came to settle, bringing his European culture and a central purpose of completely eradicating the beliefs and customs of the Indian, which he did in a fairly short period. Historical developments such as these help explain the rich variety to be found in the cultures of the Americas today.

A. Varieties in the art of the Americas.

From "Art in the Americas" in the Art News Annual we find this description of early Mexican art:

> Also I have seen the things they brought to the King from the new golden land... And in all my life I have seen nothing that gave my heart so much joy as these objects. For I have seen in them wondrously artistic things and have been astonished at the subtle ingenuity of the people in foreign lands. . . " So speaks Albrecht Dürer after seeing the treasures of Montezuma which Cortez brought back from Mexico in 1521 to lay at the feet of his Hapsburg sovereign, Charles V of Austria. Fantastic they must have seemed, these gold objects, textiles, armor and other precious possessions of the last Aztec emperor.[1]

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[1] "Art in the Americas," Art News Annual (Simon and Schuster, 1948.

1. Possible aspects and activities
    a. Look up and find pictures of some of these treasures which Dürer saw. Using gilt paint and cardboard try making some replicas of these.
    b. Examine the art pieces from several ancient Indian tribes. Some have said that there are likenessess between the arts of Bolivia and Peru and those of Alaska. Do you think so? Study the pieces for design, shape, type of motif and color.
    c. The over-all character of Latin-American art has been defined by many as a decorative, objective realism. This love of decoration and of realism showed itself in the life-sized statues made usually by native craftsmen and artists. Many of these had real clothes and jewels, and even real hair and eyebrows. Crafts and painting even today show these characteristics; a blending of Indian arts with Portuguese and Spanish influences, plus Negro and French. Find some examples of decorative realism in art.
    d. Study the pictures of the jugs and pottery of the ancient Inca Indians. Notice the use of stylized people and animals. Get some clay and design a piece of your own.
    e. In Colonial Latin America as well as in Colonial North America, there came a great flowering in the decorative arts of furniture, interior woodwork, silver and other handicrafts. It is important to remember that much of Latin America was colonized more than a hundred years before the Pilgrims landed at Phymouth Rock, in 1620. Bailey and Nasatir in Latin America - the Development of its Civilization, gives these interesting facts: Mexico City had 20,000 white inhabitants before there was an English town in North America. In 1773 when Boston was still a town of wooden buildings, Guatemala City was a luxurious city 200 years old. In 1620 when Phymouth was founded, Lima counted 4,000 houses only 26 of which were Indian. Lima houses had running water before New England had houses. Lima was the literary, cultural, and social center of South America until 1800 and by then it had 60,000 people.[1]
    Discuss why culture centers began in the Yucatan Peninsula, in Mexico, and in Adnean region rather than elsewhere on the two continents. It is true that our American Indians were both poor and nomadic in contrast to those of the above cultures.
    f. Latin American art during the Colonial Period was greatly enhanced by the Mestizo. A basic difference in the classification of Indians and Negroes in Latin American and North American culture allows the Latin American and North American culture allows the Latin colored races to play a much greater role in the advancement of their countries than they can play in the north. In Latin America they are classified on a cultural rather than a racial basis;

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[1] Helen Miller, Bailey and Nasatir, Abraham Phineas, Latin America - the Development of Its Civilization (New York, Simon & Schuster, Inc., Pub., 1948).

so that an Indian is a person with Indian culture, but if he can adopt the white man's ways, he becomes a "mestizo" or actually a white. What do you think is the best way to solve our racial problem in the United States?

g. Crafts such as weaving, basketry, jewelry, ceramics are being practiced today by many Indians and Mestizos. They and their wares are ever present at each village marketplace. Discuss why this is not so in the United States. It is true that Latin America has remained essentially agrarian whereas North America has tended toward industrialism. Can you think of other reasons for the difference?

h. During the 20th century Latin Americans have come rather suddenly face to face with the need for many large urban buildings. They are facing this problem with imagination and finding some interesting and pleasing solutions. Brazil's leading architects are Niemeyer and Costa. See if you can find pictures of Brasilia, Brazil's new capitol, or University City, Mexico City, or some of the privately constructed buildings, recreation centers and clubs. Get together a large collection of boxes of all sizes. Now try your hand at constructing a contemporary building. Be sure to construct your building with a purpose in mind.

i. The modern Mexican school of mural painting is the most influential school of art that America has produced in the 20th century. The names of Diego Rivera, Orozco, and David Alfar Siqueiros are to be remembered in this school. After you have studied some Mexican murals, do one in chalk or paint for your school wall, or plan one on a smaller scale for the new city hall in Eugene. Do we use murals for decoration of our new buildings in the United States? See if you can find examples of this. What other types of decoration are possible? Metal sculpture, fountains.

2. Selected Books

Art News Annual, Art In The Americas,, New York, Simon and Schuster, Inc., Pub., 1948.
Gives a sensitive and complete résumé of the development of art in both Americas. Available in the University of Oregon Art Library.

Bailey, Helen Miller, Nasatir, Abraham Phineas, Latin America, The Development of Its Civilization, Englewood Cliffs, N.J., Prentice-Hall Inc., 1960.
A history of Latin America with definite emphasis on their social and cultural development. Available in the University of Oregon Library.

* Christensen, Erwin O., Primitive Art, New York, Crown Pub., Inc., 1955.
This edition was published by Bonanza Books. Has a fine chapter on the primitive art of the United States and one on Mexico.

* Disselhoff, H.D., and Linne, S., The Art of Ancient America New York, Crown Pub., Inc., 1960.

Museum of Modern Art, 20 Centuries of Mexican Art, New York, Museum of Modern Art, 1940.
Available at the University of Oregon Art Library, 709.72.

* Ross, Patricia, Made In Mexico, New York, Alfred A. Knopf, Inc., 1958.
* Shippen, Katherine, New Found World, New York, The Viking Press, Inc., Pub., 1945.
  Story of native peoples of the Americas.

Steinmetz, Mildred, Indian Art of the Americas, Eugene, Oregon, University of Oregon, 1955.
  Curriculum Bulletin #153.

* Sterling, Matthew, Indians of the Americas, Washington, D.C. National Geographic Society, 1961.
  A complete coverage of all Indian tribes of the Americas.

3. Paperback Editions

* Flornoy, Bertrand, The World of the Inca, Garden City, New York, Doubleday & Co., Inc., 1958.
* Mason, Alden J., The Ancient Civilizations of Peru, New Orleans, La., Pelican Pub. Co., 1957.
* Vaillant, G C., The Aztecs of Mexico, New Orleans, La., Pelican Pub. Co , 1961.
* Von Hagen, Victor, Realm of the Incas, New York, The New American Library, 1957. Mentor Books.
* ________, World of the Maya, New York, The New American Library, 1960. Mentor Books.
* ________, The Aztec: Man and Tribe, New York, The New American Library, 1958. Mentor Books.

4. Visual Aids

Latin American folder containing many pictures and much information of Latin American art is available from the Art Office.

Mexican folder available from the Art Office; also see other listings in Sixth Grade Handbook for Eugene Public Schools.

* Pan American Union, Américas, Washington, D.C., Pan American Union.

Pre-Columbian Art Slides (12) taken of the University of Oregon Art Museum exhibit. Available in the Art Office.

* Prothman, Konrad, small color reproductions available in folder from the Resource Library.

UNESCO, Courier, New York, UNESCO Publishing Center. Available in the Art Office

B. Varieties in the Music of the Americas

The music of Latin America evolving as it did from a blend of the Indian, Negro and white races plus the Spanish, Portuguese and French nationalities is among the most exciting of all times. Here again, as we found with art, the Indian, north of the Rio Grande, was not allowed to take a strong place in the configuration of culture that became the character of United States music, the European influences were the strongest. However, in Mexico, in the West Indies, in Brazil, and elsewhere the mestizos and the negroes lent their distinct coloration to the combined musical result.

Everywhere in the reading appears the statement that music, art, and literature are a way of life with the Latin Americans. This is especially true of music. It forms an essential part of the life of the poor and uneducated as well as of the privileged classes. Especially in Mexico is this true: "Almost everywhere one goes in Mexico there is music; the soft strumming of a guitar, the beating of drums, the rattle of maracas, and voices singing. Some songs are pure Indian; others Spanish; still others a blend of the two." This statement is taken from Ruth Tooze's book, Literature and Music.

1. Possible Aspects and Activities

   a. The visitor in Mexico particularly enjoys the street musicians, or "mariachis" who sing and play the popular ballads and serenades of their country. Perhaps you already know "Chiapanecas," the Mexican clapping song or have seen the well-known "Mexican Hat Dance" performed by skilled dancers. Learn and sing "Chiapanecas" and look through your song books for other Latin American songs to learn. Don't forget to try out the Latin American dances also. Available from the Music Office is "Sing and Dance," Mexican Folk Songs and Dances, Schmitt, Hall and McCreary Co., 1945, Minneapolis, Minnesota.

   b. The Mexican festivals, many of religious origin, were encouraged back in the seventeenth century by the Spanish and Portuguese. As soon as Cortez and his men had conquered Mexico in 1521, they began to teach the children Spanish songs and games. They imported guitars and taught many Spanish dances, especially the Spanish Waltz which is still a dominant musical form in Mexico today. Frances Toor in her book, Treasury of Mexican Folkways, New York, Crown Pub., explains the grandiose and spirited festivals: Las Posadas, the Christmas Festival from December 16-24, Our Lady of Guadalupe on December 12, the carnival season in February, Cinco de Maya or the Mexican Independence Day in May, and The Day of the Dead celebrated on November 2.
   Out of cardboard and papier-maché construct some gigantic, grotesque heads to be carried in a festival parade.
   Make a pinata for a festival day.
   Learn a Mexican dance for a festival.

   c. During the Colonial period in Latin America the priests did most of the teaching of the Indians. The auto, a religious play involving pantomime and song, became very popular with the Spanish and Indians in the church. Try working out a play done entirely with pantomime based on early Spanish American history.

   d. Music was a part of the early Aztec civilization. Instruments were made simply from materials at hand:
      tlapitzalli - like an ocarina
      atecocolli - a conch shell trumpet
      ayacachtli - a hollow bone filled with pebbles
      teponaztli - a cylindrical piece of wood with an opening in the shape of an H which was struck
      huehuetl - a hollowed out tree trunk, the larger end covered with a skin parchment to form a drum.
      omitzicohuastli - a sort of grater made of bone.
   Try making some simple musical instruments of your own design.

e. During Colonial days and for sometime after, Latin Americans copied European music, but contemporary musicians are returning to native themes for inspiration. This is true of Antonio Gomes' opera, II Guarani, which has achieved worldwide fame.
Do you think this is true in the United States today? Can you find the name of an American musician who has recorded the music of our American Indians? (Thurlow Lierance)

f. In Brazil and in the Caribbean countries including the West Indies, where the negro was imported to work on the plantations, there developed some exciting and unusual rhythms and musical ideas. One of these is the rumba; others are the conga and the mambo. From Brazil came the samba and from Argentina the tango.
From the islands of Trinidad, Jamaica and Antigua have come the song, the rhythm, and the dance of the calypso. From here also come the modern steel bands, which play on old garbage cans and used oil drums.
Can you play the scale on bottles or glasses filled partly with water? Can you make a simple instrument with a few strings? It is fun to try even if it doesn't turn out perfectly.

g. Many early music cultures used the pentatonic scale. This is a 5-note scale made up of sounds such as the five black keys of the piano. Look up the difference between this scale and the diatonic and the chromatic scales.
Make up an original melody and words using only a pentatonic scale. Get a flutophone or make a flute and play your melody on it.

2. Suggested Books and Records

Bowmar records, Latin American Folk Songs (Audio Visual Supply, 429 S.W. 12th Avenue, Portland, Oregon.
Fun to listen to and to learn.

Fifth Grade Handbook, Eugene, Oregon, Eugene Public Schools, 1961.
Music of Latin America. Much information about music and instruments here.

Pan American Union, Folk Songs and Stories of the Americas, Washington D.C., Pan American Union, General Secretariat, O.A.S., 1960.
An interesting sourcebook. Available from the Music Office.

Latin American Play Songs, Children's Record Guild #5028. Available from the Music Office.

McLaughlin, Roberta, and Stanchfield, Bessie Mae, Cancioncitas, Little Songs of Latin America, Minneapolis, Minnesota, Paul A. Schmitt Music Co., 1948.
Songs to sing and many suggestions about instruments and background information. Available at the Music Office.

Pan American Union, Music of Latin America, Washington, D.C., Music Division, Pan American Union, Department of Cultural Affairs, 1960.
The whole story is here.

R.C.A. Victor, Basic Record Library, Volume 5, The Singing Program.
This volume contains many American folk tunes and songs. Available from the Music Office.

Silver Burdett Co., Around the World, and Music Near and Far, Teachers' Editions, N.J., Silver Burdett Co., 1956.
These are excellent with many Latin American songs as as well as songs from other countries plus information. Available in the Music Office.

Tooze, Ruth, and Krone, Beatrice, Literature and Music, Englewood Cliffs, N.J., Prentice-Hall Inc., 1955.
The chapter "Neighbors to the South" is an excellent one on the character of music in Latin America.

C. Varieties in the Literature of the Americas.

Carl Crow in Meet the South Americans, N.Y., Harper and Bros., 1941, quotes the literary critic of the magazine "Brazil":

"We are a people eminently gifted with literary talent with a vocation for spiritual matters. The Brazilian, like every Latin in general, is more inclined to spiritual things than to practical activities. We are naturally far more poets than economists. We have a more spontaneous sympathy for activities of the imagination than for those requiring considerable application to concrete and positive things. In literature we are more easily led to poetry than to prose - and in prose, naturally more to romance than to criticizers, more romantic historians than moralists, men of letters more than humanists."

1. Possible aspects and activities.
   a. Except for myths and legends there is practically no children's literature of Latin America available to North Americans. What do Latin American children read? Could your class write to a Latin American country and suggest an exchange of children's books? If the books are in Spanish, you could find a translator in our high schools or at the University.
   b. A university education in Latin America differs in many ways from one in the United States. In the first place there is no campus such as we have and no sports program. Tuition is generally free and the curriculum is heavily loaded on the side of the liberal arts. The son of the landowner is educated culturally first and foremost. As a man he will let an overseer handle his business problems and will spend his time in learned societies.
      It is not much of an exageration to say that every ambitious man in Latin America aspires to public office and in order to be elected he must have a university degree.
      What do you think of this situation? Is this true in the United States? Is it good or bad for a country? Why?
   c. "Besides the definite achievements in the usual fields of art, Latin Americans can be said to have attained a way of life which is an art in itself. Generally speaking, they are lovers of philosophy and take a delight in discussing abstract questions. Except in certain countries, women are still relatively sheltered from public view - an Eastern custom. Family ties are extremely strong as are those of friendship. While money-making is a necessity, it is not considered so worthwhile a pursuit as either romance or cultivation of the mind. A beautiful sentence is considered a delight." From World Book Encyclopedia, Volume 10, 1954, p. 4303.

Carl Crow in his book, Meet the South Americans, states:

"South Americans look on us as a pushing and grasping people and are slightly contemptuous of what appears to them to be our constant slaving for material success."[1] One must be aware that the ambitious Latin American who is not born into a ruling class, does not have nearly as many opportunities to advance as he would have in the United States. Learn as much as you can about these two "ways of life" and have a discussion in your class on the advantages and disadvantages of each.

d. Latin Americans, to whom a beautiful sentence is such a delight, honor and respect their authors who have made great contributions to their culture. Just as in our country, they had a Colonial period followed by the struggle for independence, and, as we might suppose, writings and prose of various types played a significant part here. A poet from Nicaragua by the name of Ruben Daria introduced the modern period in 1888 with his book of poems, Azul. This modern period is said to be characterized by a return to native themes, a violent objection to imitation, a great concern for human values and the rights of the oppressed, and a concern for education for the masses. Look again at the murals and paintings of Diego Rivera, Orozco and Siqueros and see if these modern Mexican artists were not also concerned with these selfsame ideas.
Is this true of the literature and art of the contemporary period in the United States?
If you were an artist or an author, what would you strive to tell or to show others in your work?

e. Latin America can claim the first printing press on the American continent as well as the first universities. Printing began in Mexico City in September, 1539; and almost a century before Harvard was established, there were universities at Santo Domingo, Mexico and Lima. This would seem to give them an early start, but both the press and universities were oppressed by political and religious regulations which hampered their effectiveness.
Discuss the press and the universities of our country. What rules and regulations do they have? Are they free to do and say what they wish?

f. In festival time, large crowds of Latins will spend several hours listening to a long epic poem written for the occasion. See if you can write a poem about some happening in our country. The spectacular flights of the astronauts would make a good subject.

g. Read some South American and Mexican folk tales and legends. Compare them with North American Indian legends. Plan a short dramatization or pantomime of one. Paint an illustration of a Latin American myth.

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[1] Carl Crow, Meet the South Americans (New York, Harper and Bros., 1941).

2. Selected Books

Bailey and Nasatir, *Latin America, The Development of its Civilization*, Englewood Cliffs, N.J., Prentice-Hall Inc., 1960.
Excellent background on cultural history.

Brenner, Anita, *Boy Who Could Do Anything and Other Mexican Folk Tales*, New York, William R. Scott, Inc., 1946.
Twenty-four tales of Mexican folklore.

Bryan, Catherine and Madden, Mabra, *The Cactus Fence*, N.Y., Macmillan Co., 1943.
Mexican folk tales.

Crow, Carl, *Meet the South Americans*, N.Y., Harper and Bros., 1941.
General information on the South American people, their ways of life and their hopes and dreams.

Finger, Charles, *Tales from Silver Lands*, N.Y., Doubleday and Co., Inc., 1924.
Folklore from South America, Newbery Medal winner.

Frost, Frances, *Legends of the United Nations,* N.Y., Whittlesey House, 1943.
Several legends from Latin America are included.

Griffin, Charles, ed., *Concerning Latin American Culture*, N.Y., Columbia University Press, 1941.
Available at the University of Oregon Library, 918.

Henius, Frank, Stories from the Americas, N.Y., Charles Scribner's Sons, 1944.
Stories from 20 of the American Republics.

* Jagendorf, M.S., and Boggs, R.S., *The King of the Mountains: A Treasury of Latin American Folk Stories*, N.Y., Vanguard Press, 1960.
An excellent source containing 50 stories from Mexico to Chile.

Johnson, Scott, and Sickels, *Anthology of Children's Literature*, Boston, Houghton, Mifflin Co., 1948.
Available in the Curriculum Library; contains four Latin American folk tales and myths.

Mann, Hans, *South America,* New York, Thomas Y. Crowell Co., 1957.
A wonderful book of photographs on South America. Available in the adult section of the Eugene Public Library.

Pan American Union, *Folk Songs and Stories of the Americas*, General Secretariat, O.A.S., Washington D.C.
Excellent source material on both music and literature.

Recinos, Adrian, English version by Goetz, Delia, *Popol Vuh, The Sacred Book of the Ancient Quiché Maya*, Norman, Oklahoma, University of Oklahoma Press, 1950.
The only book of its kind left.

Tooze, Ruth, and Krone, Beatrice, *Literature and Music*, Englewood Cliffs, N.J., Prentice-Hall, Inc., 1955.
Available at the Curriculum Library; it contains a fine annotated bibliography of books, fiction, and adventure about South America.

* UNICEF, "Hi Neighbor," Books I, II, III, Fun and Folklore from five countries, N.Y., U.S. Committee for UNICEF, United Nations.
Many suggestions and information on each country.

Books of fiction about Latin America available at the Eugene Public Library are listed on the following page.

Becker, Bob, Land of the Takalu
Brown, Rose, Amazon Adventures of Two children
Desmond, Alice, Feathers; the Story of a Rhea
________, For Cross and King
Kummer, Frederic Arnold, Courage over the Andes
Malkus, Alida Sims, Constancia Lona
Skinner, Constance, The Tiger Who Walks Alone
Stillman, Albert, Jungle Haven
Waldeck, Bo Besse, Little Jungle Village

There are some great tales of adventure among these.

Creative Arts and Crafts

The following unit was planned for a summer school class of intermediate grade children. The teacher's initial planning is given first and then her description of what actually happened.

GOALS

1. Work for respect of materials.
   Properties of each: What can it do?
   Let each material be what it is. Wood should look like wood.
2. Find out what various materials can do, how they can be used to express the idea, and what materials can be used together.
3. Be concerned with whether or not you have expressed your idea rather than with technical excellence.
4. Develop and sharpen perception; become more sensitive to aesthetic values.
5. Look at and evaluate works of artists and sculptors.
6. Use failure, to analyze mistakes, instead of being afraid of it.
7. Be willing to take chances for the sake of an idea. Try it out.
8. Give practice in organizing an aesthetic and clear expression of the individual's idea.
9. Practice sustained and intensive effort toward solution of problem with many chances for feeling of mastery.
10. Give practice in selecting and arranging parts to create a harmonious and meaningful whole.
11. Give practice in clarifying thoughts so that they can be expressed in tangible form.

PROCEDURE:

From more structure to less structure as teacher gains rapport with children and they gain confidence in themselves.

Each student should have a pocket notebook for ideas and sketches.

1. Discussion and categorization of materials. Begin a classroom chart of this. What materials:
   give a flat surface for ornamentation? (paper, clay, plaster, cardboard)

   give color? (paper, paint, glaze, colored metals)

   can be used for three-dimensional construction? (cardboard, metal, wood, paper, wire) can be used to imbed materials? (grout, cement, plaster, asbestos)

can be used to hold up or to form a base for construction? (plaster, wire, wood, cement)

can be used for freely moving constructions in space? (wire, reed, string, sticks, cellophane, balsa, metal, paper)

can be used to thicken or shape a basic skeletal structure or to give low relief? (cloth over wire, plaster soaked cloth, asbestos, papier maché)

can be used as a coating over another material? (enamel, wax, shoe polish, paint, plaster, shellac)

can be used as a mold? (soap, plaster over soft clay, wax)

can be used to stick one material to another? (Elmer's glue, asbestos, cement, starch, paste)

2. Areas to Investigate:

Paint and paper.
Inspiration: film, "The Pond," Encyclopedia Brittanica Films

Paint without brushes.
Inspiration: Music.
(rolls of cloth, sticks, sponge, weeds, fingers)

Boxes, cardboard, 3 dimensional construction, or a problem.
Design and make a combination car key holder and note holder for your home.
(creative architecture, people, animals)

Wire, string, plaster
Inspiration: poetry
(In motion space mobile, book, or mythical characters)

Ornamentation by imbedding.
(tile, pebbles, egg shells, seeds, etc, to be imbedded in plaster, salt and flour, grout)

Sticks, reed, cellophane, toothpicks
(Abstract construction)
Inspiration: Film:
"Alexander Calder and His Mobiles, "Museum of Modern Art Film.
Field trip: to watch Pop Bonson work with copper.

Papier-maché
Inspiration: Film showing masks of Pacific Northwest, "Loon's Necklace"
(Using stones, bones, feathers, jewels)

Nature
Organizing nature materials into a meaningful whole; driftwood, pebbles, color in seed pods, combined with plastic, wood, asbestos. Animals, people, heads, abstract organization.

Wood
Low relief with asbestos, constructions, finishing, addition of copper, cut in pieces as mosaics.

Metal
Cut in pieces as mosaic, pounded into shapes, for mobiles, constructions, embossed.

Carving clay blocks, sawdust and plaster, asbestos and plaster, wet bricks.

Stitchery - weaving.

I began with a table piled high with boxes of all shapes and sizes. I hoped this would help to free their minds of preconceived ideas of ways of working. They arranged these and eventually created an original building using any materials they could find in the room. This worked well. From this we evolved a cooperative project which took about two weeks: A Eugene World's Fair in 1980. After some experimentation with the boxes, the children decided they would like to construct buildings. Someone thought of the Seattle World's Fair and the group decided to make a Eugene World's Fair of 1980. A large piece of cardboard became the fair grounds. Buildings were finished and placed here and there on the cardboard. Someone wanted grass, sidewalks and landscaped areas. A committee planned the over-all design and others provided flowers, bushes, green grass and walks. Several students made pieces of sculpture from metal, wood and plaster which they placed on the grounds. One student planned the lighting so that all the major buildings could be lighted. There was a restaurant of unique design, a commercial exhibit building, an art museum, a science building, an international building and an aeronautics building. Finally several students designed and constructed an over head transportation system that would take people throughout the fair. It was fun to work on and fun to see as a finished project.

This provided construction and problem solving practice as they devised methods of transportation around the fair, parks, statuary, lighting, and landscaping. During this time I tried to help them to become aware of the work of today's best architects, designers, and sculptors.

There was a great variety of materials at hand; all the familiar ones plus wood scraps and tools for wood workers; metal scraps and tools for metal work; mosaic tile, seeds, and other materials for mosaics; cloth, string and yarn, wire and reed for hanging constructions; glue, cellophane, liquid solder, asbestos, clay, and plaster of paris.

The first group project drew them together and helped to free them for more experimentation on their own. As time went on, they showed more independent and individual interest in some materials, so more free time was included in the program for children to wander about the room, gather materials, think and experiment. Some with more experience in art and more manipulative skill worked on wood carving and on metal. Two girls experimented with ideas of their own on weaving and interior decoration. One girl made and furnished a large doll house. Some needed much more help in this free time in the line of suggestions of materials available and in trying to develop their own ideas.

Two field trips, one to Pop Bonson's Copper Shop and one to the University of Oregon Art Department, helped to show the children what others are doing with various materials. Yasui Sakaoka, a graduate sculptor student at the university, lent three pieces of sculptor, one from asbestos, one of scrap metal, and one of fried clay for our classroom.

I think the children showed growth in independent thinking and planning and in an enthusiasm for working out their own ideas with a variety of materials. Often the hour did not seem long enough to match the desire to complete some part of a current project. Time did not permit my using all the areas suggested in the tentative plan but individuals covered most of them at one time or another.

THE ARTIST AND HIS PROBLEM

A Resource Unit On the Art of the 19th and 20th Centuries Particularly Planned for the Academically Able

NOTE: This is a condensed version of this resource unit. The complete unit which includes an extensive bibliography, is available upon request.

I. INTRODUCTION

An identification of some of the reasons for a study of the art of our time is in order. Without it a whole world of thought, meaning and insight would be lost to us. The artist with his keen intuition and sensitivity unfolds to persevering viewers subtle and unique qualities in old, familiar subjects. Only by contact and study can we expect to understand and appreciate art and especially some of the newer forms of art, even though they significantly influence our lives in the fields of architecture, home furnishings, automobiles and in many other ways.

To better comprehend the art of this century, we must begin our study at the beginning of the nineteenth century and consider some of the social and economic problems of that time. In a study of art of any period the commonalities of all the arts; music, drama, poetry, sculpture, architecture, painting, dance, literature become very apparent.

II. OBJECTIVES

A. In terms of pupil behavior

1. Understandings
    - a. The existence of common terms and principles underlying all the arts; music, drama, poetry, sculpture, architecture, painting, dance, literature.
    - b. The reasons why artists are moved to create.
    - c. How the artist is affected by the environment in which he lives.
    - d. How the artist contributes to society.
2. Value Patterns
    - a. The artist feels a moral responsibility to paint or work as he sees the object or theme.
    - b. The artist is often in revolt against prevailing ideas and accepted patterns.
    - c. The artist is not satisfied until he has perfected a piece of work to the best of his ability even though it means great personal struggle and sacrifice.

d. The artist feels a great compulsion to put his idea on canvas or into some tangible form.

3. Skills and Abilities

a. To learn to enjoy and identify a number of works of art and and to become familiar with many artists of this period.

b. To look at many slides and prints of the works of modern artists and be able to identify and point out some of the art qualities and ways of working used by the artist.

c. To become interested in learning more about some phase or outgrowth of this unit.

d. To take part in some form of creative art or craft so as to personally experience the various phases of the creative process.

e. To manipulate some material of artists, trying to make the most of the material to express an idea.

f. To use the problem solving method in creating a useful object or a decorative one.

g. To become acquainted with good books in the field.

B. Generalizations

1. All people of all time have sought ways to express spiritual and aesthetic impulses, but these ways differ.

2. The social and economic conditions of the time effect each artist's expression.

3. Each artist's personal life whether it be one of hardship or ease affects his work.

4. The art of an age differs in various parts of the world due to differing cultural patterns.

5. Art encompasses much more than painting; includes architecture, crafts, interior decoration, landscaping, designing of clothes, designing of cars and equipment.

6. The statement, form follows function, has had a significant influence on contemporary art.

7. When an artist deviates from the factual he gets into the field of distortion.

8. Some experts believe that art to be really great must contain universal and timeless elements.

9. The aim of the artist is sometimes stated in this way - to find the world in a blade of grass - to find the universal in the particular.

10. Oscar Wilde says art improves on nature.

11. The artist is concerned with exploring and making the most of the material he has decided to use.

12. The artist's life is often sad and full of troubles, yet experiencing deep joys and ecstatic thrills unknown to other men.

13. One should work for tolerance toward all works of art not yet understood or found pleasing. A Greek proverb says, "Man raises, but time weights."

14. Goethe said, "One ought, every day at least, to hear a little song, and read a little poem, see a fine picture, and, if it were possible, to speak a few reasonable words."

15. Many artists such as Henry Moore are concerned with trying to find the unique qualities of the person or animal, exaggerating or distorting them until he gives us the very essence of that picture.

16. A number of 20th century artists are expressing a negative reaction to the conflicting social and economic pressures of our day.

III. ANALYSIS OF THE UNIT

In each of the following periods two aspects of the study are given in detail in the complete form of the unit:

A. Trends and events influencing the art of this period.

B. Schools, artist groups, individual artists, architects, and craftsmen of this period.

1. The period from 1789 to 1865.

2. The period from 1865 to 1905.

3. The period from 1905 to the present day.

"The Bridge," a group of German expressionists including Heckel and Kirchner.

Paul Klee who employed a pshchological use of images and symbols.

Oskar Kokoschka, still living.

Vassily Kandinsky (1866-1944) the theory of abstract paintings.

Henri Matisse, Braque, Picasso - all abstractionists.

Feininger who employed refraction of light.

Chagall

Salvador Dali, the surrealist.

Grosz (1893-) influential in showing a decadent society.

John Marin, American.

Constructivism (1917) in the works of Gabo, Pevsner, Lissitzky, and Maholy-Nagy.

Morris Graves (1910) a West Coast artist.

Sculpture of this time as done by Barlach, Henry Moore, Epstein, Brancusi, Lipohitz, Calder.

Architects of distinction such as Gropius, Frank Lloyd Wright, Richard J. Neutra, Miss Van der Hohe, Belluschi, Le Corbusier.

Industiral designers such as Saarinen, Norman Bel Geddes (1927). Eames, Wegner (1951).

IV. SUGGESTED ACTIVITIES

A. Initiating the Unit

1. This unit might be introduced by taking a field trip to the University of Oregon Art Museum, and then working with the children to delineate questions to be answered and phases of the content to be pursued.

2. If a good display of larger colored prints could be arranged, this would be a good starting point.

3. Several colored prints of artists' works from the 17th and 18th centuries might be contrasted with several examples of contemporary art. This could lead to provocative questions to be answered in research activities by the students.

4. An interesting display of examples of good industrial design might be the point of departure.

5. Films or filmstrips are often used.

6. Students might begin with a discussion of their impressions of contemporary art and architecture.

B. Suggested Developmental Activities

1. Discussion groups and panel discussions interspersed, with time for research to answer pupil questions.

2. Individual scrapbooks showing the special interests of each.

3. Resource people help to enrich the background.

4. Reading biographies of painters and architects help to clarify reasons for various directions taken.

5. A study of music and musicians of this time reveals many similarities.

   The impressionist period in music as evidenced by Debussy and his flakes of melody and dabs of orchestral color.

   The late romanticists - Skryabin (1905) and Richard Strauss, Stravinsky, Milhaud, and Bartok.

   Twelve-note music as introduced by Schonberg.

   Modern eclecticism as evidenced by Shostakovich, Copland, Rawstherne.

6. An interesting and almost necessary side-trip would be a study of the history from 1800 to the present time.

   1814-1848 - a period of liberal thinking but not much action with ideas tending toward more freedom and a certain vague equalitarianism.

   1846-1914 - a period of industrial, social, religious and political ideas showing new material powers of man.

   The Industrial Revolution from 175- to 1850.

   Robert Owen (1771-1858) founder of Socialism.

   Charles Darwin and The Origin of the Species, 1859.

   An over-exaggerated idea of nationalism in the 19th century.

   The beginnings of internationalism: Tennyson,
   "Till the war-drums throb'd no longer, and the
   battle flags were furled,
   In the parliament of man, the Federation of
   the world."

   Period of fast colonization of many areas of the world such as Africa and parts of Asia.

   1853 Commodore Perry opened up trade with Japan.

   Period of capitalism and monopolism from 1850 to 1900.

   The middle class increased in wealth and importance and tended to become the patrons of the arts.

   The growth of the cities as the result of the Industrial Revolution and the decline of the crafts.

   In 1917 Russia collapsed and oragnized a Republic.

   The First World War from 1914 to 1918.

   The Theory of Marxism.

Collapse of 1929 and the depression.

Hitler and the Second World War, 1939.

Pearl Harbor, December 7, 1941.

7. This study could be correlated with the literature of this period in history.

    Malthus (1866-1834).
    Lord Byron (1788-1824).
    Goethe (1749-1832).
    Shelley (1792-1822).
    Keats (1795-1821).
    Wordsworth (1770-1850).
    Longfellow (1807-1882).
    Charles Dickens (1812-1870).
    Tolstoy (1828-1900).

    Dramatists such as Victor Hugo, Ibsen, Chekhov, George Bernard Shaw, and Constantin Stanislavski.

8. A study of various individual's ideas of art:

    Leo Tolstoy - "A means of union among men, joining them together in the same feelings, and indispensable for the life and progress towards well-being of individuals and of humanity."

    Emile Zola - "A corner of nature seen by a temperament."

    Oscar Wilde - "All art is at once surface and symbol."

9. A study of the changes and advances made in architecture during this period.

10. A more lengthy study of sculpture during this period might be made by a group or by an individual with this special interest.

11. A study of Modern Dance as it relates to this period.
    The dance went through similar periods of an interest in individualism, in nature as opposed to the machine, and finally in distortion, rhythm, time and space.

12. A brief introduction and beginning of an understanding of the philosophies of this period.
    Francis Bacon and René Descartes are looked upon as founders of Modern Philosophy. Their ideas laid the foundation for modern science.

    Baruch Spinoza - The first modern system of philosophy.

    One type of modern philosophy whose departure is idealism is followed by Kant, Hegal, Schopenhauer, Emerson.

    Another type whose departure is science is followed by Hume, Mill, Spencer, Diderot, James, and John Dewey.

13. An extended study of the way in which Industrial Designers have influenced our lives today.

14. Each student could pick out one material used by artists or something still not experimented with and do a creative piece of work. This could be a painting, drawing, piece of ceramics, sculpture, carving, mobile, or a construction. In doing this the student will have to define his problem and then attempt to solve it.

15. Make a study of good films, filmstrips, slides and records to find similarities and differences in the various arts.

16. Make a study of one artist such as Cezanne, or Picasso, or Seurat to find out about their theories.

17. Experiment with printing processes and use them for a practical purpose such as to advertise an exhibit.

18. Each choose a field to do a creative piece of work such as art, architecture, sculpture, poetry, music, dance. Afterwards compare the process of creation in these fields.

19. Discuss what stimuli prompts people to create. Is it love, bitterness, sorrow, success, joy, admiration, patriotism, a compulsion to put down ideas and feelings in terms of form, color and space?

20. According to interests try to do a problem in designing a building, clothes, furniture, silver, dishes, landscape.

21. Make a list of words used in this unit which can add to a vocabulary. Make a dictionary of these words.

22. Create something practical to show that "form follows function" is a good rule.

23. Contemporary artists used symbols many times. Make a collection of as many symbols as you can including the use of colors as symbols.

V. EVALUATION

A. Teacher could keep an anecdotal record of students' activities and attributes.

B. Evaluation should not be left until the end, but performance should be checked by the students against their own standards listed at the beginning of the experience; that is, the checking should be done often and after each experience in the unit.

C. Carry on a class discussion or a panel discussion to see if any of their ideas and opinions about contemporary art have changed.

D. Teacher observations of understandings and attitudes about art.

E. Students fill out a check-sheet on habits, understandings and attitudes.

F. As a culmination the students could prepare an hour's presentation on contemporary art to be given to students of another grade level.

Social Studies

A WORLD APPROACH TO HISTORY THROUGH THE BIOGRAPHIES OF FAMOUS MEN

- Abraham Lincoln
- George Washington
- Leonardo da Vinci

PLANNING AN ISLAND CIVILIZATION

Introduction

One way of arousing interest and making the past seem more vital and meaningful to children is to place emphasis upon the life and times of persons who have made major contributions to particular fields of endeavor. This emphasis on the use of biographical materials in teaching history is known as the biographical method.

In speaking of biographical study Harold Black has said, "Though it (a biography) sets the main character in the center of the stage, it also protrays the life of the world around him, gives the reader a knowledge of historical relationships, increases his information concerning persons and events and shows him their influence upon the world at large."[1]

The value of using biography in teaching social studies is summarized in this way by Ralph Brown, "Thus we see that we can use biography to improve the teaching of the social studies because it vitalizes history through adding interest, vitality, reality, and simplification of forces and movements; we use it to enrich and make more complete the materials of history because it complements history, furnishes specific instances that can be used to exemplify general trends or activities, provides a possible transition of interest from the personal to the more impersonal aspects of history, and can be used to expand students' understanding of the world. Through the use of biographical material we can also help our students to identify and develop democratic values."[2]

A broad view of history through the biographical approach is an effective method to use with advanced pupils, supplementing the regular social living curriculum. It is an invitation to inquiry. Stress should be placed upon developing broad principles; critical thinking and problem solving; the research process, especially historical research; the skills of communication, group work, map reading, and dramatic play; the structure of this field of study and the special tools of history; and an appreciation of our American heritage.

Da Vinci was included in this series of biographical studies because such a study would encompass the fields of science and art particularly, and would introduce the children to a highly creative person from another era. Thomas Jefferson would be another possibility for this type of study.

Genevieve Foster's books, which are written with this biographical approach, and the American Heritage book, Thomas Jefferson and his World are excellent as key books in such a study. The many excellent biographies now available for children will provide much of the necessary supplementary material. Ruth Anderson gives five kinds of biographical literature that may be used: "straight" biography, biographical fiction, drama, poetry, and biography in textbooks.[3] Original documents and personal letters and accounts are an excellent source of raw data, but if these are not available the papers may be edited and excerpted.

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[1] Harold Garnet Black, "Biographical Literature," The Journal of Higher Education, 21: 260, May, 1950.

[2] Ralph Adams Brown, "Biography in the Social Studies," Social Studies in Elementary Schools, Thirty-Second Yearbook ~~of the National~~ Council for the Social Studies, Washington, D.C., 1962.

[3] Ruth O.M. Anderson, "Biography in the High School," Social Education, 13:74-75, February, 1949.

Historical Research

In order to get full value from studies of the past, pupils must use many sources of information. Children need to become acquainted with the tools that historians have used in studying the past, long before the modern tools of history were invented, as well as the newer tools such as photographs, printed material, motion pictures, slides and tapes, phonograph records, newspapers, etc. They need to develop the skills involved in historical method:

Research	location of all the available facts; use of every possible source
Interpretation	evaluation of facts; selection of relevant facts
Presentation	summary of findings; reporting orally or in written form. This last step requires careful selection of facts, ordering of the information, and conclusions concerning the problem.

In Teaching Gifted Elementary Pupils How to Do Research there is a description of a project in which children of a High Achievers class in the Riverside Elementary School of Bloomington, Minnesota took part in a course in educational research. The authors describe how gifted elementary children can "become familiar with some of the most powerful concepts of research in the behavioral sciences, in order that these concepts might become tools in their learning early in their educational careers." It is recommended that this training would be suitable for high-achieving children at about the fifth or sixth grade level.

After giving a background on what research is, the different ways of doing research, and what educational research is, a personal problem in historical research is given in detail. Given here is a description of historical research and historical method.

Historical research (historiography): describes what was; a way of learning the results of experiments conducted by time. It involves investigating, recording, analyzing, and interpreting events of the past for purposes of generalizations that might prove useful in understanding the present and predicting the future. Focus is on change, growth, or development of individuals, practices, movements, institutions, or ideas.

Historical method: Applied to bodies of knowledge other than history, it refers to a method of investigation by which the past developments or experiences of the object under consideration are studies and generalizations developed.

Applied to the study of history, it refers to the process by which historians gather, examine, select, verify, and present historical facts and interpretations in an oragnized form.

It includes: analysis (testing for authenticity of sources) and synthesis (putting together the particulars into a narrative or other unity).[1]

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[1] E.Paul Torrance and R.E.Myers, Teaching Gifted Elementary Pupils How to Do Research (Minneapolis, Minn., Perceptive Publishing Co., 1962), pp. 7, 11.

Our American Heritage

It has been said "that our documents state our ideals." Source reading from the classics of American political and constitutional documents and speeches can become the principal route to discovery of an accurate image of the past... Nothing else so effectively conveys the tone and spirit, the habits of thought, of a given time. Their use should add depth and warmth to children's understanding of their national heritage.[1]

One of the goals of education in general is responsible citizenship. A responsible citizen is one who understands and appreciates his rights, duties, and privileges. He knows and values the heritage that is his as a citizen. He understands the ideals that are the essence of what we call the American way of life.

During the school year many opportunities present themselves for developing understanding and loyalty to American ideals and institutions. In addition to this, plan to read with your children some of the great ideas and historical documents. One textbook has this to say to the student concerning important ideas and documents:

> When you read important historical documents, you are studying history as a historian studies it. You are looking for the great ideas that have changed men's thinking. You are also trying to get an understanding of the spirit of the time in which these documents were written.
>
> Most of the selections given here are parts of documents; a few are complete. In some, the language is strange and the sentences are long and difficult. Try to find the main ideas in each document.[2]

In addition to reading such documents, some attention can be paid to historic landmarks and monuments, patriotic holidays, poems and songs, symbols of democracy, and famous slogans and sayings.

Given here is a list of writings and documents that have shaped America. The list is not exhaustive, but merely suggests the kinds that should be profitable. Some may be read in their entirety while excerpts from others would be more appropriate.

The Mayflower Compact - 1620
Massachusetts School Law of 1647
Roger Williams: Liberty Is Not License - 1655
Alexander Hamilton: Argument on Freedom of the Press - 1735
Patrick Henry: Liberty or Death Speech - 1775
Letters of John Adams to His Wife - July 2, 1776
Declaration of Independence - July 4, 1776
Washington: Message to American Troops - August, 1776

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[1] Robert A. Lively "History in the Study of the Americas," In The Americas (Chicago, Scott, Foresman and Company, 1962), p. 38.

[2] Paul R. Hanna and others, In The Americas (Chicago, Scott, Foresman and Company, 1962), p. 408.

Thomas Paine: The Crisis - 1776
Benjamin Franklin: The Constitution - 1787
Preamble to the Constitution of the United States - 1787
Bill of Rights - 1791
Washington: Farewell Address - 1796
Speech of Tecumseh - 1810
The Monroe Doctrine - 1823
Daniel Webster: Liberty and Union - 1830
Lincoln: Gettysburg Address - 1863
Lincoln: Second Inaugural Address, With Malice Toward None - 1864
Inscription on the Pedestal of the Statue of Liberty - 1886
Woodrow Wilson: Message to Congress - 1917
Rabbi Gittelsohn: At Iwo Jima - 1945
Franklin D. Roosevelt: Speech That Was Never Given - 1945
Preamble to the Charter of the OAS - 1951
Dwight D. Eisenhower: Inaugural Address - 1953
John F. Kennedy: Inaugural Address - 1961

Note: Most of these writings may be found in these references which are available in the Resource Library.

Angle, Paul M., By These Words, New York, Rand McNally and Co., 1954.

Brown, Harriett M. and Gudagnolo, Joseph F., America Is My Country, Boston, Mass., Houghton Mifflin Company, 1955.

Hanna, Paul R. and others, In the Americas, Teacher Ed., Chicago, Ill., Scott, Foresman and Co., 1962.

Making Plans

In developing the idea of making plans, refer to the notebooks or journals of such famous people as Leonardo da Vinci and Benjamin Franklin. The observations, notes, diagrams, and drawings put into Loneardo da Vinci's notebooks as he observed, read, and studied will be of great interest to children. The fact that he wrote his notes backwards will provide further interest. Both Franklin's Plan of Conduct, to be found in his journal, and the proverbs and sayings of Richard's Almanac, which Franklin says were taken from "the wisdom of many ages and nations," should hold fascination for the reader. Excerpts from the following books could be read with profit:

Hahn, Emily, Leonardo da Vinci, pp. 21-22
Linscott, Robert N., The Notebooks of Leonardo da Vinci
Franklin, Benjamin, The Autobiography of Benjamin Franklin
Larabee, Leonard W., The Papers of Benjamin Franklin, pp. 281-318
Van Doren, Carl, Benjamin Franklin's Autobiographical Writings, p. 704

One other suggestion: Be sure that as pupils plan a course of action they provide for goals that are realistic, yet challenging.

The World of Abraham Lincoln

This area of study was chosen for the educationally able because it provides:

- a biographical approach to the study of history
- a "world" approach to the study of history
- a simpler way of fixing historical people and events by "era of time" rather than memorization of dates
- a comparison of developments among people with differing backgrounds
- a time correlation with the 4th grade social living units on the Pacific Northwest - from Lewis and Clark, 1803, to statehood, 1859
- an opportunity for developing the inquiry process

Specific concepts to be gained are:

- man's search for freedom
- the struggle for freedom against European aristocracy's refusal to release power in Latin and South America and Europe, itself
- the awakening of awareness of the West in Asia
- the difficulties of keeping the states united because of differences of needs in the various areas of our new nation
- Oregon's development in relation to other world events
- Abraham Lincoln's understanding of the dignity of man

Motivation:

- display good pictures on the bulletin board
- films pertinent to the area of study
- assemble different kinds of materials needed in the development of the unit and let the children have the time and opportunity to become acquainted with it
- use a citizen of the community who has had a rich background or interest
- discuss information learned about the Pacific Northwest in the regular classroom
- field trips to museums
- read biographies and historical fiction

Suggested activities:

- make a study of one person's life - Lincoln, McLoughlin, etc.
- search for each important person who crossed paths with Lincoln
- find freedom quotations from men of the period

  "...and musing there an hour alone,
  I dreamed that Greece might still be free..." Byron from Marathon
- find union quotations from men of the period

  "Our Federal Union. It must be preserved." A.Jackson at Jefferson dinner.
- make time lines for a special purpose
- prepare a bulletin board portraying significant events
- do some creative writing; dramatization of personalities
- write original freedom poetry or quotes to add to those of the period
- make an arrangement of collectors' items of this period

The World of Abraham Lincoln

Lincoln	Pacific N. W. and West		United States		Latin America		Europe	
Events	People	Places Events	People	Places Events	People	Places Events	People	Places Events
	Lewis&Clark	Exped. N.W.	Jefferson	Louisiana Pur.			Napoleon	Emperor - France
	J. Astor	Astoria		Embargo				
	McLoughlin	Ft. Van.	Madison	War of 1812			Adm. Nelson	
Born 1809	Jed. Smith	trader	Clay	Rep.-Dem's			Wellington	
	Ewing Young	trader	Calhoun	War Hawks			Gen. Blucher	Waterloo
Kentucky	John Ball	teacher	D. Webster	Federalists	Liberators	Royalty		
			Monroe	M. Doctrine	Miranda		Hapsburgs	Austria (600)
Indiana	Jason Lee	mission		Missouri Com.	S. Bolivar	Venezuela	Hohenzollerns	Prussia
Mother died			J. Marshall	Supreme Court	San Martin	Argentina		Congress of Vienna
Sarah Bush L.	M.Whitmans	mission	Com. O. Perry	"Lawrence"Erie"		Chile		
School	Blanchet		C. Vanderbilt	trade		Peru	Prince Metternich	Holy Allies
Railsplitter	DeSmet				B. Jaurez	Mexico	George III	England
							Czar Alexander	Russia
Illinois	Fremont	explorer	A. Jackson	Indian Wars	Santa Anna	Napoleon	Charles X	French
	Kit Carson	scout	Tecumseh	Creeks	Mexican	of West	Louis Philippe	Revolution
Ann Rutledge	N.Wyeth	guide		Seminoles	General		LaFayette	Champions of Freedom
Mary Todd	P.S. Ogden	factor Van.	S. Houston	Cherokees		Pan. Am.	Gladstone	
	Joe Meek	Oregon trail		Alamo		Congress	Disraeli	
Storekeeper			Black Hawk				D. Livingstone	Scottish Missionary
Soldier	B. Young	Mormon leader					Queen Victoria	and Explorer
Postmaster	G.Abernethy	Pro. Gov.					Albert	Peace Fest.
Surveyor	"49ers"	Gold rush	Com.M.Perry	Japan				Greek Inde.
Legislator		"Bonanza"	Van Buren	Treas. System			Karl Marx	Working men's
Lawyer		Nevada	Polk	Mexican War				Revolution
Debator	Joel Palmer	Indian Affairs	Z. Taylor		Pedro II	Brazil		
			W. Garrison	Abolitionist			Bismarck	Prussia Prime Minister
		Pony Express	S. Douglas	debates				
President			Seward	Sec. State			Napoleon III	
	J. Whiteaker	1st governor 1859		Alaska			Eugenie	
			Stanton	Sec. War				
Emancipator				Emancipation			Nicholas I	Crimean War
				Proclamation			F. Nightingale	British nurse
			R. Lee	C			Victor Emanuel	
			J. Davis	S i			Garibaldi	united Italy
Commander-in-Chief			Beauregard	S e v				
			U.S. Grant	l o i			Alexander II	Russia frees serfs
			W. Scott	a e l				
			Sherman	v s				
			McClellan	e s W			Alexandra and	
			Meade	r i a			Prince of Wales	
			C. Barton nurse	y o r				
				n	Maximilian	Emperor of Mexico		
Assasinated 1865			S.B.Anthony	Suffrage				
			E. Stanton		Archduke of Austria			

The World of Abraham Lincoln

Pacific N.W. and West		United States		Europe	
		People	Contribution	People	Contribution
				Charles Darwin	naturalist
				Stephenson	improved steam locomotive "Rocket"
		Peter Cooper	locomotive "Tom Thumb"		
		Samuel Morse	telegraph Morse Code		
					steamships "clipper ships"
		Elias Howe	sewing machine		
D. Thompson	cartographers	Samuel Colt	repeating rifle		
		C. McCormick	reaper		
		C. Goodyear	vulcanized rubber	Daguerre	photographic process Fr. inventor
F. Barclay	doctor	C. Field	transcontinental		
J. Preston	geologist	1st Atlantic cable.	railroad	F. deLesseps	Suez Canal Fr. diplomat
T. Condon	geologist				
			matches bathtubs		
		Washington Irving	writer historian	Beethoven	German composer
		Oliver W. Holmes	author & physician	Sir Walter Scott	Scottish novelist and poet
		Francis Scott Key	St. Sp. Banner	Victor Hugo	French poet, novelist, dramatist
		John James Audubon	naturalist	Alexandre Dumas	Fr. novelist and dramatist
		Noah Webster	lexicographer and writer	Charles Dickens	British novelist
		Emerson	essayist & poet	Keats	British poet
		Thoreau	naturalist & author	Shelley	British poet
		Alcott	Little Women	Byron	British poet
		Hawthorne	writer	Carlyle	Scottish essayist and historian
				Thackeray	British novelist
		Harriet B. Stowe	Uncle Tom's Cabin	Tennyson	British poet: poet laureate
		Whittier	poetry	Wordsworth	British poet: poet laureate
Applegate	sage of Yoncalla	Longfellow	poetry	Browning	British poet
				Wagner	German composer
Lt.C.Wilkes	5 vol. about N.W. explorer	Stephen Foster	song writer & composer	Jenny Lind	Swedish singer
		Mark Twain	Tom Sawyer	Tolstoy	Russian novelist & social reformer
		Horace Greeley	Journalist & politician	Hans C. Andersen	Danish author-fairy tales
H.J.Warre	artist	James R. Lowell	poetry		
P. Kane	N.W. paintings				
J. Standley	Willamette valley artist	Currier & Ives	Prints of American history, life, manners "Gettysburg Address"		
A.Bierstadt	Mt. Hood pictures				
H.Bancroft	historian & statesman				
Joaquin Miller	poet				

The World of Abraham Lincoln

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Across the continent with Lewis and Clark.

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Cayuse, 1848; Rogue River, 1850's, Yakima, etc.

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The World of George Washington

This area of study was chosen for the educationally able because it provides:

- a biographical approach to history
- a "world" approach to the study of history
- an opportunity for developing the inquiry process
- a simpler way of fixing historical people and events by "era of time"
- a comparison of developments among people with differing backgrounds
- a time correlation with the 5th grade social living unit on the Colonial Life in the Western Hemisphere - from George Washington's birth in 1732, throughout his Presidency of the United States, until his death in December, 1799.

Specific concepts to be gained are:

- man's search for freedom
- the struggle for freedom against European aristocracy's refusal to release power in Latin America and Europe, itself
- George Washington's strong will and self control, his keen sense of justice, and his perseverance, which made him a man all his fellow Americans could trust.
- an awareness of the forces leading up to the American Revolution and post-war trials of the states

Possible methods of initiation:

- With the coming of the November elections, a study and comparison of the elections at the present time as compared with the election of the first President of the United States.
- See item #1 in the Suggested Activities as another aid.
- Pretend that you are George Washington. It is a most refreshing April morning, 1789. You have risen early to look after the spring work on the plantation. At noon you return from the fields and are told that a messenger is waiting to see you. Your family gathers about you, for they too are curious and excited. Slowly you open the message and you find that your countrymen have chosen you to be the first President of the United States. For one short moment you are silent. Then you speak . . .

  (Prepare either orally or written what you think Washington would have said to his family as they were gathered there.)

Suggested Activities:

1. Find all the pictures you can of the dress of the American colonists. Consult your reference books. This would make an excellent bulletin board display.
2. Prepare a colonial newspaper. You might have fashion notes, a letter from London, or news from other colonists.
3. Draw a cartoon that will show how the Colonists felt about the Stamp Act, the tax on tea, or the Boston Massacre. Watch cartoons in our own newspapers, too, for good ones on present-day events.
4. There is much good reading to be had about this period. Some very interesting book reports might be given in class.
5. Make a time line for a special purpose.
6. If you like writing better than drawing, you could write editorials for the newspaper, perhaps one for each year. Example - 1785-1789.

7. Pretend you are a newspaper reporter at the scene of some event you have read about. Write a news report of what took place. Remember a good news reporter tells his readers the answers to "Who?" "Where?" "What?" "When?" and "Why?"
8. Make a Who's Who that you can add to from time to time.
9. Find out how "Yankee Doodle" became the song of the American Revolution.
10. Find out about the art, music, and literature of Colonial America. See unit "The Character of Early American Culture."

3

The World of George Washington

Washington	Canada and N.W.		United States		Europe	
Events	People	Places Events	People	Places Events	People	Places Events
Born Feb. 22, 1732 Virginia			Daniel Boone	Pioneer, esp. Kentucky	George Anson	Sent to S.A. to harass Spanish
As A Boy Surveyor Traveled widely Soldier French and Indian War Developed rugged health and military experience that helped defeat the British. Married Martha Custis	Montcalm Amherst Wolfe Braddock Chief Pontiac	French & Indian War Capture of Quebec	Benjamin Franklin	Best known American at this time: statesman diplomat, author scientist, inventor	Frederick Maria Theresa Madame Pompadour Louis XV	SEVEN YEARS WAR
			Patrick Henry	Patriot orator statesman. Taxation arouses Colonists. (Sugar Act and Stamp Act)	George III	Imposes taxation on the Colonies
			John Hancock	1st signer of the Dec. of Independence Boston Massacre		
As Commander-in-Chief			Samuel Adams	Boston Tea Party Leader in Amer. Rev.		
Commander-in-Chief in the Revolutionary War.			Paul Revere &	Minute Men Old North Church patriot		
Courageous in the darkest hours.			Wm. Dawes	Patriot Continental Congress "Whigs" "Tories"		
Crossed the Delaware River to surprise the Hessians at Trenton, N.J. Victory brought new confidence.			Revolutionary Henry Burgoyne Clinton Howe Gage Ethan Allen Nathan Hale Cornwallis	War Begins Lexington & Concord "Bunker Hill" "Green Mt. Boys" American spy Valley Forge	Beaumarchais Lafayette Catherine II Joseph II Marat Mirabeau Danton Robespierre "Jacobins"	Sent supplies to America Aided the colonies War on Turkey FRENCH REVOLUTION LEADERS

The World of George Washington

Washington	United States		Europe	
Events	People	Places Events	People	Places Events
First in Peace Met with Benjamin Franklin, Madison at the Constitutional Convention. (1787)	Thomas Jefferson	statesman, writer, 3rd president of U.S. Wrote the Dec. of Indep. (1776)	Louis XVI and Marie Antoinette	King of France Beheaded Queen of France Wife of Louis XVI Fall of the Bastille July 14, 1789 French Revolution begins
Presided at the Convention	George Rogers Clark	Won forts in the N.W. and gave U.S. claim. Battle of Brandywine & Germantown, Saratoga. Soldier, frontiersman.		
Chosen first President of the U.S. (1789)			Napoleon Bonaparte	Made French Emperor of France as Napoleon I Made French general Fought against Italy, and came into power.
	John Paul Jones	Sea battle of "Ben Homme Richard" and "Serapis"		
Built firm foundation for U.S. government establishment under the Constitution.	Cornwallis	British general and statesman. Surrendered to Washington at Yorktown		
At Mount Vernon Experimented with newest farming methods.	John Adams Franklin John Jay	Signed Peace Treaty with England 1783 Treaty of Paris		
		SHAY'S REBELLION		
Owned and managed several large plantations.	J. Madison	4th president of U.S. "Father of Our Constitution" First census 1790		
Loved his beautiful home, but duties kept him away. Died Dec. 1799	A. Hamiliton	Statesman and writer on government. Advocated the assumption of state and national debts. Natl. Bank		
	John Jay	Statesman & jurist, 1st chief justice of the Supreme Court		

The World of George Washington

United States

People	Contribution
Benjamin Franklin	scientist, inventor electricity & many other inventions and discoveries
Nathaniel Bowditch	navigation
Eli Whitney	inventor, cotton gin
Robert Fulton	inventor, steamboat
Thomas Jefferson	influence on architecture Monticello, Capitol of Virginia U. of Virginia
Benjamin Franklin	"Poor Richard's Almanac" Newspaper - Penn. Gazette Autobiography First cartoonist
Thomas Paine	writer on government and religion "Common Sense"
Washington Irving	The Sketch Book Rip Van Winkle
Benjamin West	artist - beginning of American school of painting
John Copley	artist
John Trumbull	painting of Revolutionary War
Charles W. Peale	paintings of Washington
Gilbert Stuart	paintings of Washington & American Revolution
Paul Revere	silversmith
Henry Steigel	glassware
Duncan Phyfe	cabinetmaker

Europe

People	Contribution
Watt	inventor, British engineer steam engine
Priestly	British chemist, author discovered oxygen
Lavoisier	French chemist discovered oxygen
Hargreaves	British inventor Spinning Jenny
	Pompeii un-earthed
Joseph & Stevens Montgolfier	French inventors balloon-1st successful flight
Jenner	British physician Vaccine - Smallpox
Spode	British potter - Spode ware
Wedgewood	British potter - Wedgewood
Chippendale	British cabinetmaker Furnituremaker
Goethe	German poet,dramatist, novelist
Goya	Spanish painter and etcher
Bach	German organist - composer
Mozart	Austrian composer

The World of George Washington

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The World of Leonardo Da Vinci

This area of study was chosen because it provides:

an opportunity to explore the art and science of a great man and a great era.

an opportunity to develop the inquiry process.

Specific concepts:

This period in history saw the birth of individual freedom and the realization of the worth and dignity of man.

Man began to crave a better life on earth and started to seek ways to achieve it.

Artistic abilities were encouraged and some of the greatest works in history were produced during this period.

Many old beliefs and customs were questioned and real scientific research was begun.

An appreciation should be gained of the many facets of Da Vinci's genius.

It should be appreciated that success and accomplishments come through hard work and study, even though a person may have great ability.

An appreciation should be gained for the worth and beauty of what we call "works of art" and of what they have contributed to history and culture.

The student should come to realize that an active, open mind is necessary in the pursuit of knowledge.

Possible methods of initiation:

The group may try to find out where the basic ideas for some of our modern machines originated. This could lead to the uncovering of Da Vinci's genius and the world around him.

The teacher may quote some of Leonardo's prophecies and observations. The group might be surprised to discover that these were made 500 years ago which in turn might motivate further research into Da Vinci's world.

The group might discuss our modern scientific accomplishments and try to discover the origin of the basic ideas. It will become obvious that many men and ages have contributed to these ideas. This could lead to the discovery of the "Father of all Inventors," Leonardo Da Vinci.

After examining the models made of Da Vinci's "machines," the group may want to learn more about the inventor. This examination may also include Da Vinci's paintings, or begin with them.

Suggested activities:

Trace the development of some of Da Vinci's inventions through history, using pictures, graphs, models, etc. (Examples: Weapons and instruments of war; architectural ideas; study of human anatomy)

Dramatize incidents in the lives of important people of this period of history to be presented over KRVM or for a school assembly.

Visualize a "mechanical" problem that faces mankind today and work out a solution for it using written reports or plans, illustrations, models, diagrams.

Do extensive research into the preparation, knowledge and planning necessary for the creation of a work of art. The teacher might then "commission" an interested student to create an object of art. (picture, sculpture, etc.

Construct musical instruments and compose music to play on them.

Trace the development of printing from Gutenberg's time to the present, emphasizing the impact it has had on man's development and on civilization as we know it.

Examine The Notebooks of Leonardo Da Vinci and read some of his observations, fables, and sayings. Why did da Vinci call this a "collection without order?" Why did he keep notebooks such as these? Devise a workable plan for keeping a notebook, one that will have real value now and later on.

Either through individual or group inquiry, explore the many facets of da Vinci, the man. Report these findings to the class.

The World of Leonardo da Vinci

Leonardo da Vinci	History	Art	Science
In Florence (Venice, Mantua) 1500–1505 One-half year under Cesare Borgia Paints "Mona Lisa" "Virgin, Christ and Saint Anne" "Battle of Arghiari" More war inventions, diving equipment	Machiavelli (It.) 1469–1527 Put forth ideas on politics and diplomacy, author The Prince Cabral discovers Brazil (Port. 1500) Erasmus 1466–1536 (Holland) Great humanist, scholar Japan - Middle of Feudal System (1500) China - Middle of Ming Dynasty (1500) Increase of European contracts Louis XII (Fr.) King of France (1498–1515)	Michelangelo (It.) 1475–1564 Artist and architect University of Louvain (Dutch 1500) Titian (It.) 1477–1576 Auburn haired Christians & pagans Lucas Cranach (Ger.) 1472–1553 Portraits - religious, humorous Greek mythology	Philippus Paracelsus (Swiss) 1493–1541 Physician Applied chemistry to medicine
In Milan visits to Florence 1506–1512 Scientific studies & writings Writes notebooks Experiments with flight Experiments with human anatomy	Henry VIII - King of England (1509)	Saint Peter's Cathedral begun (1506) Albrecht Dürer (Ger.) 1471–1528 Painter and engraver	
In Rome visits Parma 1513–1515 Serving Giuliano de Medici Invented thread-cutting machine (screws, bolts)	Balboa (Sp.) discovers Pacific Ocean 1513 Ponce de Leon (Sp.) lands in Florida 1513 Francis I (Fr.) Invades Italy (1515)	Holbein the Younger (Ger.) 1497–1543 Famous portrait painter Raphael (It.) 1483–1520 Famous Madonnas	Mercator, Gerhard (Flem. 1512–1594 cartographer, lecturer geographer
At Amboise, France 1516–1519 serving Francois I Last painting "Saint John, the Baptist"	Martin Luther (Ger.) Splits Christendom (1517) Cortes (Sp.) attacks Mexico (1519) Magellan (Sp.) ships circle world (1528) Suleiman I (Turk) 1494–1566 10th ruler Ottoman Empire	Sir Thomas Moore (Br.) 1478–1535 "Utopia" & "Biographies" Benvenuto Cellini 1500–1571 Artist and sculptor Francois Rabelais (Fr.) 1494–1553	Copernicus Solar System Andreas Vesalius (Belguim) 1514–1564 Father of anatomy

The World of Leonardo da Vinci

Leonardo da Vinci	History	Art	Science
Born near Vinci, near Florence, Italy 1452-1468 much sketching (1464) decorated shield in perspective (1468) parents recognize artistic ability	Mayan & Toltec culture ends (1450) Fall of Constantinople to Turks (1453) End of Hundred Years War (1453) War of Roses Begins (1455) Gutenberg (German) makes printing practical (1456)	Florentine Donatelle (It.) sculptor 1386-1466 Nezahualcoyotl - Inca poet (1450) Andrea Del Verrocchio, 1435-1488 sculptor, painter, goldsmith, taught da Vinci Francois Villon (Fr.) 1431-1464 vagabond poet (1456) satire & death Roger Van Der Weyden (Flemish) painter of 1399-1464 haughty, proud figures Hugo Van Der Goes (Flemish) realist 1440-1482 painter of portraits, altar pieces	Gutenberg invents movable type 1440
Apprenticed to Verrocchio, Florentine artist 1469-1480 sketch of Bernardo Baroncelli Hanging (1478) begins to work on his own	Pope Nicholas V - Vatican Library Lorenzo Medici (Italian) 1449-1492 Pachacuti & Topa Inca (1471-1493) Extend Inca Empire to full size	Pope Sixtus IV (1471) gave people works of art in the Campidoglio (capital)	
Goes to Milan 1481-1499 serving Lodovico Sforza as painter, sculptor, engineer, inventor	Height of Inca Power in Peru (1480 Ivan III the Great (Russian) frees Russia from Tartars (1480) King Henry VII, King of England First Tudor (1465) Bartholomew Diez (Port.) Reaches Cape of Good Hope (1486) Pedro da Covilham (Port.) Travels overland through Egypt to Red Sea solves mystery of "Preston John" 1487 Ferdinand V 1452-1516 & Isabella unified Castile & Aragon Fall of Granada to Spain (1492) Columbus (It.) discovers America for Spain (1492) Moslems & Jews expelled from Spain (1495) Cabots (Eng.) explore N. America (1495) First voyage of Amerigo Vespucci (1497) Vasco da Gama sails around Africa to Far East French capture Milan (1499) Savonarola (It.) 1452-1498 Prophet and martyr		Fra Laca Paciole wrote "Summa de Arithmetica" (1494)

The World of Leonardo da Vinci

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A biography with drawings and paintings.

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PLANNING AN
ISLAND CIVILIZATION PROJECT

This is a description of a project undertaken by a sixth-grade workshop class in which learning experiences were directed toward some of the most important learnings of the social studies. As each child became involved in his own learning through personal inquiry, the study included history and geography, civics and government, science, economics, sociology, anthropology, language arts, mathematics, and creative arts. This description is not intended as a complete unit but rather as a means of pointing out some of the key ideas.

Purpose:

To make use of, and extend knowledge in the areas of social science, language arts, mathematics and creative arts.

General overview:

Students are given the location of an imaginary island on which they are to plan and establish a modern day civilization. As desired, many other conditions and characteristics of the island may be specified. Activities will vary with the interests and the background of the students, amount of time for such a study and facilities and materials available.

Suggested approaches:

"Find" an old treasure map. (To give appearance of age, smudge, tear and wrinkle map. Then smooth it out and brush lightly on back with cooking or linseed oil.)

Receive a message written in code which when deciphered gives legal claim to the island specified. (It would add interest to find the message in a drift bottle.)

Receive a telegram from an unknown uncle telling of the island he has procured for you on one of his trips.

Receive a letter from the president of the United States outlining a plan similar to the Homestead Act whereby you may qualify for ownership of a particular island.

Possible unit development activities:

Discuss weather and climate factors.

Make a map(s) of island and work out a key to show land forms, mineral resources, etc.

Make up names for island, city, rivers, mountains, etc.

Plan the best location for the first city. Discuss factors favorable to city growth.

Discuss probable imports and exports.

Plan distribution of land. How much land should one person be allowed to buy? How much is land worth? How large are city lots?

Make a report on surveying.

Invite a realtor to discuss land ownership, contracts, mortgages, etc.

Discuss people who will live on island. What makes a good citizen? What are essential occupations and professions? Make lists of personal and professional requirements.

Develop an application blank which will help screen applicants.

Study various types of governments and decide which will be best.

Hold a debate using a topic such as "Blank Island should have a pure democracy."

Write a constitution.

Interview policemen, educators, doctors, merchants, etc., to understand needs and problems of people.

Take field trips to observe a court in session, organization of city, county, or state government, a hospital, a power plant, a city library, etc.

Lay out your first city. Make a map of the down town area. Indicate schools, court house and/or other government buildings, stores, churches, etc.

Keep a diary or journal.

Plan transportation and communication facilities both to and from the island and on the island.

Plan newspaper, television, radio and magazine advertising to entice people to live on the island.

Design a travel poster featuring your island.

Write a feature story for the Sunday edition of your city newspaper telling about your proposed island civilization.

Write script for a television interview or give a short talk on the advantages of living on the island.

Write an imaginary history of the island.

Design a flag for the island.

Write a song for the national anthem.

Design an official seal.

Make an annotated bibliography of all readings.

Make a notebook or scrapbook to tell the complete story of your island civilization.

These are samplings from notebooks or scrapbooks kept on the island civilization project.

Table of Contents

- Note to Teacher
- My Diary
- Planning Your Own Ideal Community
- Island Civilization
  - Maps of My Island
    - Physical Features
    - Population - Main Cities
    - Minerals
    - Capital City
    - Transportation
  - Interesting Facts About the Island
  - Criteria for Pupulation
  - Jobs for the People of My Island
  - Application Blank
  - Advertising
    - Pamphlets
    - Contests, Coupons
    - Posters
    - Television
    - Radio
    - Magazines, Newspapers: Want Adds and Feature Stories
  - Government
    - Flag and Seal
- Government
  - Federal
  - State
  - City
  - Court Systems: Description and Charts
  - United States Constitution: Preamble and Outline
- Bibliography

Radio Advertisements

I have good news for all you lucky people listening to the radio today. A new island is being colonized near here. This island, which is a part of the Marshall Islands, has much fertile soil and many good harbors. The land is cheap - $100 an acre, $75 for a town lot. Many new opportunities will come up if you will only call DI 5-5377 and get more information about the island.

* * * * * * * * *

Come to Watase Island in the Marshall Islands! Good climate and good land at the low price of $200 for one acre of farm land, $75 for one acre of grazing land.

Don't miss this wonderful chance to see beautiful beaches, trout-filled streams, breath-taking mountains, and many other beautiful scenes. For free information write to 2396 Washington Street, Eugene, Oregon.

Newspaper Advertisements and Feature Stories

Kathy's New Island

A beautiful island in the Pacific Ocean, Watase Island, is now ready for colonization. Kathy W------, owner of the island, has planned out her first city. The name of this lovely city is Waisen City and it is located on The Bay. "The population will be 1,000 to 1,500 at first," says Kathy, "then the population will grow later."

The soil is very good with water, minerals, and nice land form. It's priced very cheaply at $200 for one acre (truck gardening, etc.) and $75 for one acre (grazing land).

The island has wonderful climate and is a good resting place for worn-out nerves and other tensions.

There are jobs for everyone, so come one, come all! For information call DI 5-5490.

* * * * * * * * * * * * * * * * *

A party of settlers is colonizing an island 400 miles off the coast of Lima, Peru. Half of your shipping costs will be paid. There will be a 6000 pound limit on shipping per family and 1000 pound limit for a single person. For more information call DI 7-3590 or go down to the main office, 2675 S.W. Crest Boulevard in downtown Eugene.

* * * * * * * * * * * * * * * * *

Miss Rhonda T------, wealthy business woman, has risked her wealth in a business venture, colonizing an island in the Pacific Ocean.

She has been rather successful in getting people to apply for jobs on this island. She says, "I believe this venture will turn out all right in spite of the cost."

She is the oldest in a family of four. Her residence is in Eugene of which Miss T----- is very proud. She worked her way through college and then became wealthy.

Miss T------ invites all to come to her island. To get in touch with her, phone DI 3-1237.

Radio Broadcast

Good day, ladies and gentlemen. If you are fed up with high taxes and expensive homes and farmlands, why not come to the beautiful island, Dragon Knoll.

Listen, moms, dads, brothers, sisters, everybody. If you are unemployed but have good training come to Dragon Knoll for a job. Land sells for $200 on up an acre and only $1000 a lot.

Applications won't last long! Call your local employment agency or this number, DI 3-1237 for information about applications. Offer is good only until 1500 people have signed up, so hurry!

POSTERS

NEW ISLAND
BEING COLONIZED

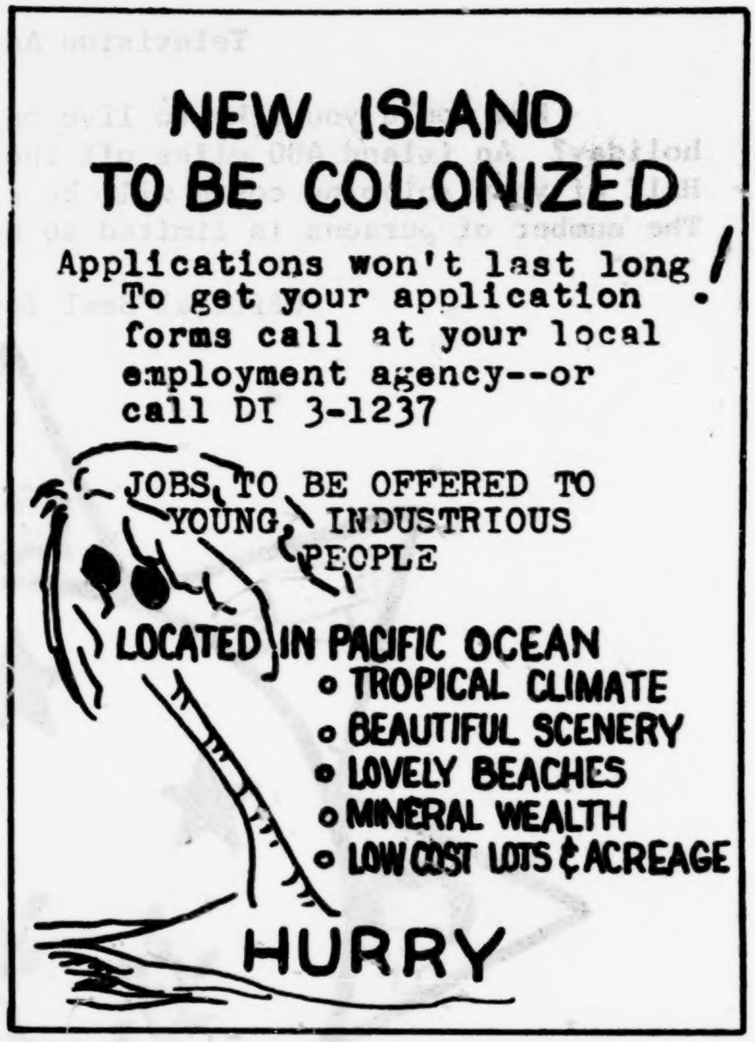
GOOD
·SOIL ·WATER · CLIMATE · LOCATION
LOCATED NEAR MARSHALL ISLANDS
SOUTH PACIFIC OCEAN

CHEAP LAND:
$100 ACRE
$ 75 LOT

Great Opportunities
for people of all trades
• • • •

MUST SHOW JOB & PERSONAL
REFERENCES

CALL NANCY B.— DI 5-5537



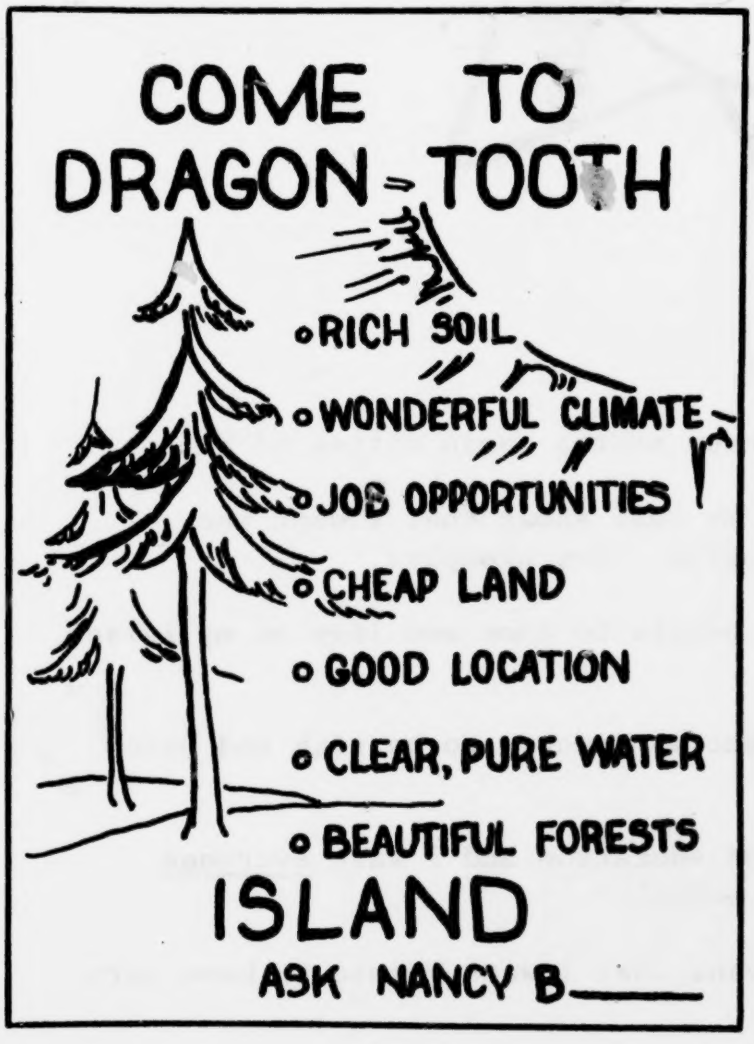
NEW ISLAND
TO BE COLONIZED

Applications won't last long!
To get your application
forms call at your local
employment agency--or
call DI 3-1237

JOBS TO BE OFFERED TO
YOUNG, INDUSTRIOUS
PEOPLE

LOCATED IN PACIFIC OCEAN
- TROPICAL CLIMATE
- BEAUTIFUL SCENERY
- LOVELY BEACHES
- MINERAL WEALTH
- LOW COST LOTS & ACREAGE

HURRY



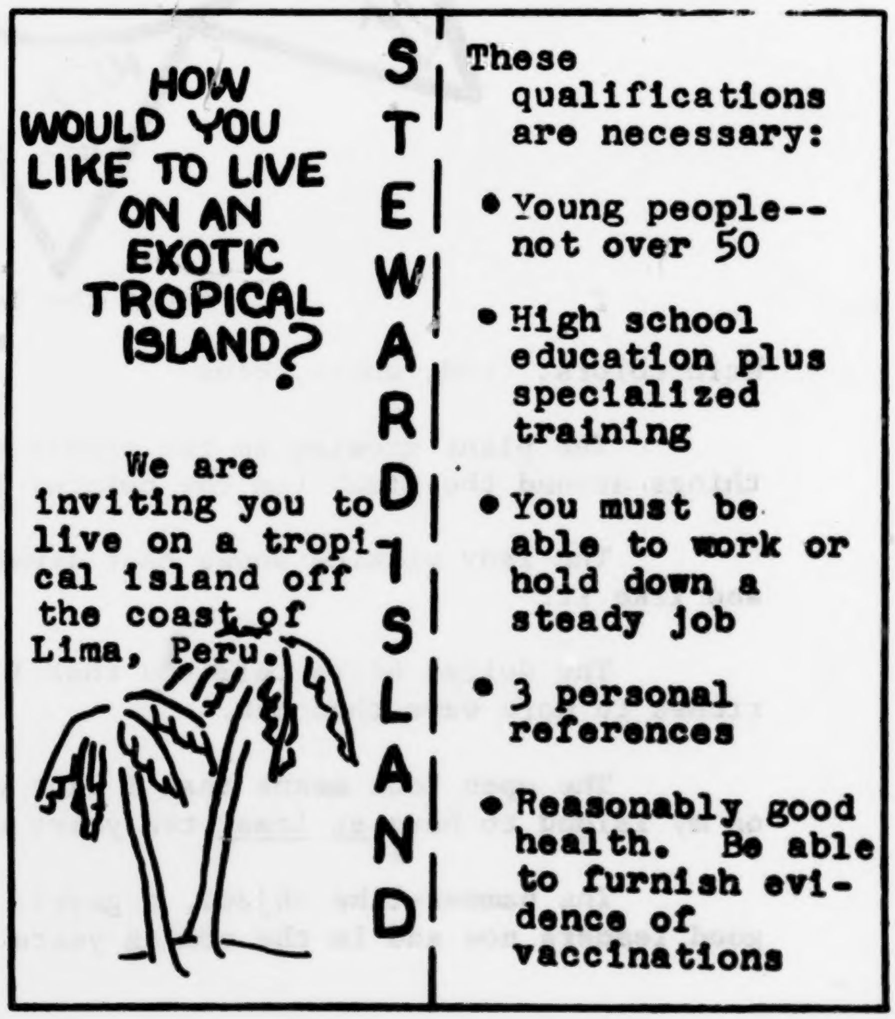
COME TO
DRAGON-TOOTH

- RICH SOIL
- WONDERFUL CLIMATE
- JOB OPPORTUNITIES
- CHEAP LAND
- GOOD LOCATION
- CLEAR, PURE WATER
- BEAUTIFUL FORESTS

ISLAND

ASK NANCY B.____

BROCHURE



STEWARD ISLAND

HOW
WOULD YOU
LIKE TO LIVE
ON AN
EXOTIC
TROPICAL
ISLAND?

We are inviting you to live on a tropical island off the coast of Lima, Peru.

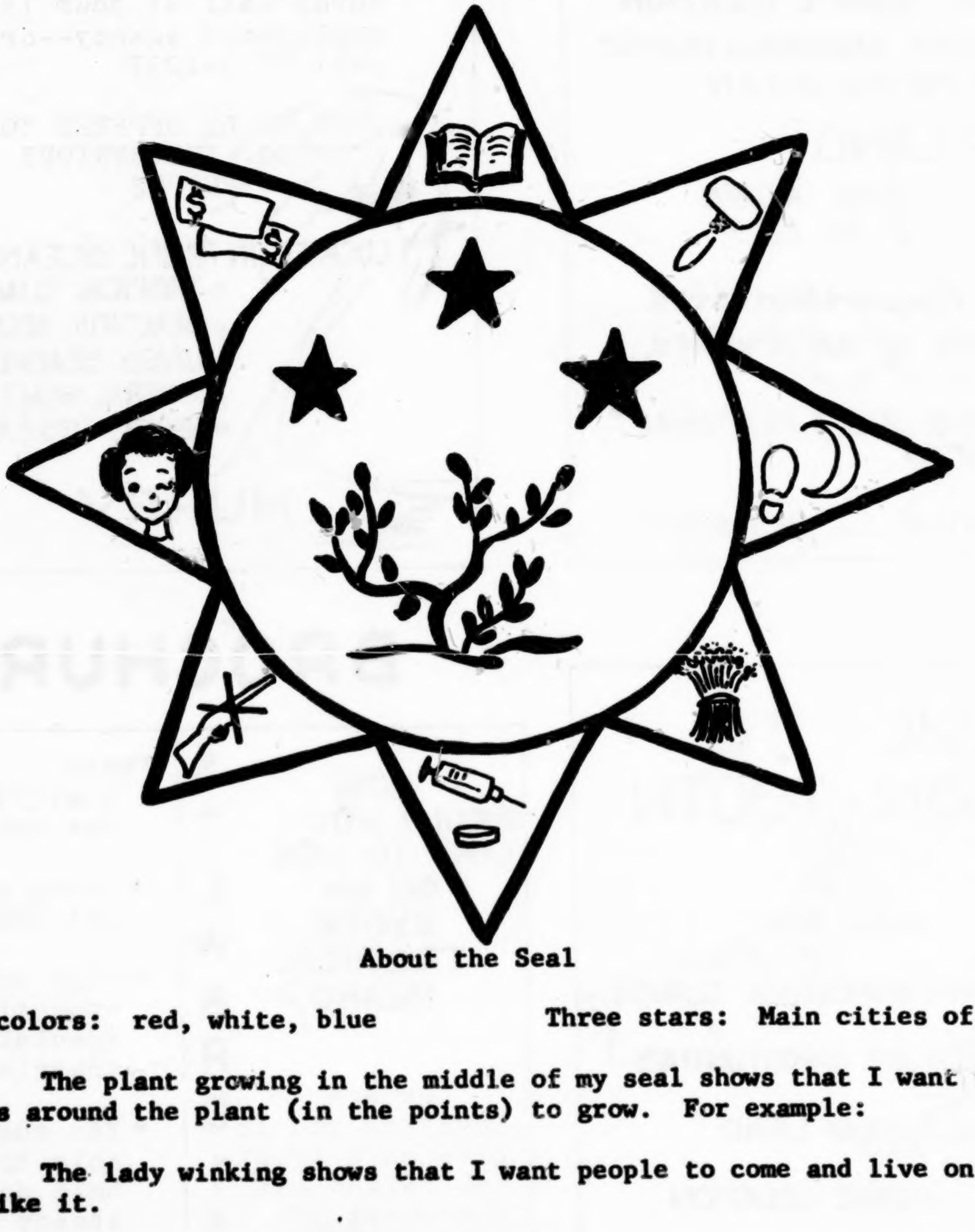
These qualifications are necessary:

- Young people--not over 50
- High school education plus specialized training
- You must be able to work or hold down a steady job
- 3 personal references
- Reasonably good health. Be able to furnish evidence of vaccinations

Television Advertisement

How would you like to live on a tropical island where everyday is a holiday? An island 400 miles off the coast of Lima, Peru is being colonized. Half of your shipping costs will be paid. For more information call DI 7-3590. The number of persons is limited so hurry.

Official Seal for Watase Island



About the Seal

Main colors: red, white, blue

Three stars: Main cities of Watase

The plant growing in the middle of my seal shows that I want the things around the plant (in the points) to grow. For example:

The lady winking shows that I want people to come and live on my island and like it.

The dollar bills tell you that I want my country to be rich and have riches in more ways than one.

The open book means that I want good education and I want everyone on my island to have at least ten years of school.

The hammer-like object, a gavel, means that I want Watase to have very good leaders now and in the coming years.

The footprint and the moon represents this: I want my island to be able to have enough equipment and scientists to explore space or to take steps in science.

The wheat field tells you that I don't want any of the people on the island to be hungry. I want everyone to have enough food.

The pill and shot-giver in the other point means that I want many good doctors who can find cures for cancer, polio, etc.

But above all, the last point in this eight-pointed star shows that I want Watase to have peace with all nations. The crossed-out gun means I want NO WAR!

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Our Wonderful World, a thematic anthology

World Book Encyclopedia

Sciences

Archaeology

- Oregon Before the White Man
- Introduction to Archaeology and Archaeology of the United States
- Archaeology of Latin America

Oceanography

- Origin of the Ocean
- Surface Features of the Ocean
- Under Water
- Waves, Tides and Currents of the Ocean
- Content of the Ocean
- The Evolution of Oceanography

Mathematics

Science Units

Archaeology

Oregon Before the White Man

An Introduction to Archaeology and the Archaeology of the United States

Archaeology of Latin America

Archaeology was chosen as an area of study for advanced pupils for a variety of reasons. An introduction to this branch of anthropology provides a means of understanding human beings and human relationships, of understanding that the scientific study of man takes many different forms, and of realizing that people throughout the world are at work digging into the past in order to add to our knowledge of the past. The archaeological tools of scientific inquiry, the notebook, the inventory card, the photographic index, the petrographic microscope, etc.; the methods and techniques used in the discovery, the survey, the digging, and the evaluation of findings; the interrelatedness of the sciences; the relation of archaeology to the arts - all of these provide ideas to challenge the imagination.

Throughout the intermediate grades a study of the history of mankind through the fascinating science of archaeology should lead to certain important concepts and generalizations. The pupils will become aware of the contributions to medicine, astronomy, literature, painting, sculpture, and language that have been brought about by this science. They may be motivated by the romance involved in each discovery and by the interesting dramatic qualities of this field, with the end result - an increase in interest and scientific curiosity. The pupil will develop increased understandings and appreciations of civilizations other than his own. He will see how he can use this information to understand better our present culture and to have a greater insight in predicting the future.

There are many avenues open for exploration because of the involvement of so many branches of science. The study can range from the pupil's own neighborhood to the farthest reaches of the world. With the invention of new tools and techniques, archaeology is even more fascinating today than it has been in the past.

OREGON BEFORE THE WHITE MAN

The purpose of this unit is to extend the study of the Indians of the Pacific Northwest beyond that which is usually done in the fourth grade. As developed here, the unit is organized to suggest an approach to studying the Indians of this area on a comparative basis. This study of a culture based on hunting and fishing includes the Northwest Coast Indians, the Basin Indians, and the Plateau Indians. It can be expanded through additional topics such as dialects and languages, trade, dances, art, and current work being done by anthropologists in the state of Oregon.

During the summer of 1962 three archaeological teams from the University of Oregon worked at checking dam sites before these areas became flooded. Also, earlier in this same year, a fossil crocodile skull and jawbone was discovered in North Central Oregon. It was identified and assembled under the direction of J. Arnold Shotwell of the University of Oregon. Newspaper accounts of such expeditions, a visit to the Museum of Natural History, or the use of a resource person could provide the initial stimulation for the study.

Northwest Coast Indians

Distribution

West of the Basin, extending from Alaska Pan Handle down to northern California.

Food

Vegetable - Acorns (the staple) seeds, wild greens, berries, pine nuts, fungus, seaweed (for salt)
Animal - Deer, rabbits, birds, rodents, shellfish, salmon, elk in Oregon, fish

Hunting Method

Fish - nets, weirs, pens, traps, hooks, scaffolds, harpoons
Animal - fences, run-down, deadfalls, bow and arrow, deer whistle, brush fires, bird snares and traps

Clothing

Male - usually very little, caps of fur, deerhide robes, skin breechcloths and aprons, leggings in winter - two-piece moccasins (upper of deerskin, sole of elk) headdresses of bird scalps and hoops of stuffed deerskin; flowing headnets, tule-mat rain capes, arm and hand tattooing marks for measuring dentalium strings (used as money)
Female - twined basketry caps, fiber string aprons, fore-and-aft aprons of skin, front decorated with seeds, back with shell below hips, skin robes, tattooing on chin

Houses

Low, conical-roofed plank houses with side entrance; camp shelters, dome-shaped, brush or grass thatch; male sweat house; some female segregation

Equipment

Household - Basketry; twined with quill and grass overlay; for eating, serving, stone boiling, seed-beating, winnowing, storage, mortars; spoons of horn, mussel shell, and wood; some wood platters and hallowed-out chests
Transportation - dugout canoes
Hunting - self-how, sinew-backed bow; arrows, spears
Other - Cradle: sitting type of basketry, Pipe: tubular wood, some with mortised stone bowl. Miscellaneous: wood foot drum; rectangular rawhide drum (Oregon): stick-clappers, deer-hoof rattle, whistles, flutes; horn and wooden wedge and adzes; dentalium and clamshell disk money, decorated elkhorn purses.

Games

Shinny, archery, ring-and-pin in south, hand and many stick games, shell dice, tops, cat's cradle

War

Bow and arrows, clubs of wood and whale bone, elkhide armor, a few twined-rod jackets. Surprise attacks; took heads and slaves; tournaments.

Main Tribes

Chinook, Coastal Salish (Tillamook and Siletz), Yaquina and Alsea, Siuslaw and Lower Umpqua, Coos and Lower Coquille, Southwest Athapascan (Tututni and Upper Umpqua), Kalapuya (in the Willamette Valley), Takelma.

Basin Indians

Distribution

The intermontane country between the Rockies on the east and the Sierras and Cascades on the west.

Food

Vegetable - Seeds, roots, nuts, sunflower seeds
No farming, known as "Diggers."
Animal - Rabbits, rats, lizards, caterpillars, grasshoppers; few deer, antelope, fish, birds.

Hunting Method

Grasshoppers were driven into trenches; crooks, clubs, large nets for rabbits; brush inclosure for antelope.

Clothing

Male - Early: very scanty. Later: skin shirts, some fiber sandals, rabbit skin robes and blankets, leggings.
Female - Early: cedar-bark fringe aprons, basketry caps, shell beads. Later: sleeveless tunic, fringed except around the arms, yucca sandals; chin tattooing; some later had plains-type dresses.

Houses

Domed wickiup of poles and brush; brush windbreaks and huts; no steam bath huts; no female segregation hut except for the southern Ute.

Equipment

Household - Basketry was coarse; some fringe areas used fine types; coiled and twined, made into seed-beaters, mush bowls, cooking baskets, pitched canteens; mats for bedding and covering; some molded pottery; Southern Paiute made pointed bottom clay pots.
Transportation - Mostly on foot in search of food; some pack sacks on dogs; river tribes made rafts of tule (cattails).
Hunting - Sinew-backed bow, crooks, clubs, nets.
Other - Cradle: crude, v-branch with cross-rods and fiber pad; northern tribes used board with skin cover. Pipe: tubular wood cigar-holder type, or stone; Gaming devices: gambling equipment, bull-roarer.

Games

Ball-juggling, hand games, hoop-and-pole, ring-and-pin, double ball, football, four-stick game, tops.

War

Very rare, defensive type, took scalps, some chases and raids; used twelve-foot spears with a long blade. Bow: short, recurved, sinew wrapping in center; thick hide shields; poison arrows; rawhide armor.

Main Tribes

Northern Paiute and Bannock.

Plateau Indians

Distribution

The upland area stretching from the Fraser River in Canada and down through the Columbia drainage into the United States. Includes only a few patches of forest and lake. Mostly barren upland cut by two great rivers, the Columbia and its tributary, the Snake.

Food

Vegetable - Bulbs (camass), bitterroot, berries, wild plants and seeds.
Animal - Mainly salmon, fish, deer, elk, beaver, and mountain sheep.

Hunting Method

Fish - seines, dip nets, spears, hooks
Animal - annual trips for game; used dogs, nets, snares, deadfalls, calls, disguises and decoys, blinds and corrals.

Clothing

Male - Early: nothing or rabbit skin robes.
Later: complete skin clothing; soft, gathered-at-the-instep moccasins, no cuffs; skin caps; woven rabbit-skin robes.
Female - Early: small fore-and-aft aprons and socks made of cedar and sage fiber; fez-shaped basketry hats.
Later: tunics of skin, belted and fringed; basketry hats and caps, skin and rabbit-fur robes, skin leggings.

Houses

Early: winter earth lodges and summer gabled arbors.
Later: gabled pole structures with cattail mats or brush cover, smoke hole and skin doorway; four to six families; male sweat house; female segregation huts.

Equipment

Household - Baskets: high elaboration, coiled and imbricated, highly decorated; stone cooking in baskets; pottery not known in historic times; mats for bedding and coverings; few bark vessels, stone mortars, and wooden pestles; horn spoons, soft twined bags.
Transportation - crude dugout canoe, some bark in northwestern section; in east, bullboats of skin over willow frame, shaped like a large tub.
Hunting - Sinew-backed bow, club and spear.
Other - Cradle: general, flat elipsoid board, skin-covered. Lower Columbia River - top cut so that it resembles a stone arrowhead. Fraser-Thompson - imbricated basket type. Pipe: tubular, cigar-holder type, stem of wood with clay or stone insert. Miscellaneous: many gambling devices; ornaments of bone, stone, copper. Bone flutes: reed pipettes. Drums: bags of skin, some painted, some of undressed hides.

Games

Ball-juggling, dice games, double ball, handball, hand games, hoop-and-pole, ring-and-pin, shinny, stilts, tops.

War

Bow and arrow, lances, rod and slat armor, heavy skin shirts, wooden clubs. Later: very large shields; Central Plateau were largely pacifist - sneak raids at night; seldom scalped; did not cut off heads; prisoners' hair used in place of scalps.

Main Tribes

Sahaptin: Molalla and Cayuse, Nez Perce, Walla Walla, Umatilla, Klamath and Modoc.

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An Introduction to Archaeology

Rather than study the field of archaeology intensively in the fifth grade, it would seem best to establish some of the major concepts and then to concentrate on archaeology of the United States. To become acquainted with archaeology, its relationship to anthropology and other sciences; to learn about the tools, methods, and techniques of this science; and to establish some of the major concepts would lay an adequate foundation on which a study of the archaeology of the United States might be made. Such a study might include:

> The story of the unwritten history of the United States, the story of the "lost American," is one of the greatest stories of the western hemisphere. The mysterious mounds in the Mississippi valley, especially Ohio's "Great Serpent" effigy mound; the "Skyscraper" Pueblo town of New Mexico, and "Minnesota Minnie," who might have been an Ice Age woman; the lost 25,000 year old cave in New Mexico are all a part of this unwritten history that archaeologists are trying to unfold.
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> The origin of the native Hawaiians offers another avenue of study. There are several popular theories about their origin, one being that the Hawaiian race probably originated in southeast Asia. The mystery of the first settlers to the islands is being unravelled through the new dating methods.
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> The use of vertical stratigraphy and the more recent "beach ridge dating" has helped to discover the first traces of man in the Arctic. Traces of early Alaskans, their sites, and time periods are being explored by arctic archaeologists as they examine the frozen mounds of western Alaska.

Two record charts are included as suggested ways of keeping a record of information found while reading. One chart provides a dated history while the other provides a history through the men that are outstanding in this field.

Possible Methods of Initiation

Tell the children about the recent excavations by the National Park Service and the National Geographic Society in Colorado's Wetherill Mesa where three cliff cities were uncovered. Twenty skeletons were found and seven storerooms filled with pottery and corn husks. Indians settled the Mesa Verde area about the time of Christ, then abandoned it 1,300 years later. The cliff cities were lost to man for 600 years after the Indians abandoned them and then were discovered in 1888 by Richard Wetherill and Charles Mason. How have archaeologists gained a clearer understanding of the culture and history of these cliff-dwellers who vanished so mysteriously before Columbus discovered America? Why did these Indians build fortress cities on the cliffs? Why did they abandon them?

Tell the children about some recent archaeological finds. This may stimulate the search for other such finds. Magazines such as Natural History, Scientific American, Science Digest, National Geographic, and Life should be quite productive for this purpose.

Another approach might be to discover and discuss the interdependence of many branches of science in unraveling the countless age-old mysteries of the world. Archaeologists need the help of many kinds of scientists - geologists, botanists, zoologists, petrologists and mineralogists, chemists and physicists. Many of these children have an interest in one or more fields of science. The realization of the use of an already familiar field of science in conjunction with archaeology could very easily provide stimulus for study in this area.

Approach the unit as a great treasure hunt, moving from one rich discovery to another. Start with great material finds of treasure. Move from material treasure into artistic treasure and then introduce the concept of cultural treasure. A good study of an area can develop from the interest created by the investigation of the various treasures.

A planned display of examples of early civilizations. A good discussion could develop including ideas, inventions, relations to our own way of life, etc. which we owe to these civilizations. The group could then do preliminary research out of which could grow the planning for study of the unit.

A well-prepared trip to the Museum of Natural History and the Oriental Museum could provide stimulus for beginning the study of archaeology.

Basic Understandings:

To realize that the scientific study of man takes many different forms.
To learn the value of scientific procedures in investigation.
To realize that archaeology is a relatively new field of science.
To realize that archaeology is but one branch of anthropology, the others being physical anthropology, cultural anthropology, and linguistics.
To realize that specialists in the various branches of anthropology work by different methods, aut they must share their findings in order to understand mankind.
To understand the use of special tools and methods and the problems unique to archaeology.
To accept education and training as prerequisites to scientific research.
To develop a respect for ideas and the building of ideas.
To realize that ideas are not unique in any one civilization.
To realize that knowledge and understanding is an ever-changing process.

Attitudes and Appreciations:

An appreciation of the arts and literature of early people.
An appreciation of the knowledge and skill of early people in their buildings, inventions and discoveries.
An attitude of respect for people of other lands and other times.
A desire to share and cooperate with other people of the world.
A greater appreciation of our own comforts and conveniences, realizing that a great many of them are gifts from other people and from early times.

Project Ideas - Individual or Group

Trace the growth (history) of archaeology as a science.
Study in depth an individual or group of archaeologists and their contributions.
Explore the various inter-relationships between the field of archaeology and the other sciences.

Study the methods and tools of archaeologists: methods of detection, recovery, and preservation.
Compile a list of archaeological mysteries - work out own theories of solution.
Relate archaeological finds to the Bible. (Dead Sea Scrolls)
Trace contributions made by early societies to present day life: inventions, mathematics, astronomy, government, religion, etc.
Write original stories concerning the lives of various groups of ancients.
Trace the development of tools, weapons, arts, crafts, etc.
Scale model reproductions of various archaeological sites or achievements: pyramids, temples, simple homes, machines, methods of agriculture, transportation, etc.
Write newspapers and letters as they may have been written by someone living in an early civilization.

How old is "old"? How do we determine how old something is? Study the various methods of dating: guess dating, the first method of dating back beyond the earliest historical records; geologic dating, dating which depends on changes in climate, rates of stream erosion, of weathering and of sedimentary and groundwater deposits; radiocarbon dating, one of the newest methods which depends upon the radioactivity of certain elements; tree-ring dating or dendochronology; and archaeomagnetism, another new method based upon the fact that many rocks and clays are measurably magnetic.

The earliest histories were not written but oral - songs and sagas like the battle and adventure tales Homer told in the Iliad and Odyssey. But we know now that most of their tall tales have a real basis in fact. The ruins of Troy were found by a man who had only Homer's description of its locations to follow in his search.[1] After reading the Iliad and the Odyssey of Homer, children may become interested in classical archaeology and the work of Heinrich Schliemann who found the ruins of Troy and the treasure of Mycenae.

Oceanography, particularly underwater oceanography, may lead to an interest in underwater archaeology. The story of "Cities under the Sea" is a fascinating one.

Through the study of the development of language, children may want to study about the deciphering and decoding of ancient scripts such as the decipherment of the Minoan Linear B script and the decoding of the Maya script through the cryptogrammic method and electronic programing.

Add to the chart on discoveries and discoverers; make one for the United States.

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[1] Jane Wermer Watson, The Science of Mankind, (New York, Golden Press, 1960), p. 16.

RECORD CHART

DATE IN HISTORY	FIND	DATE OF FIND	FOUND BY	EXPLORED BY	CHARACTERISTICS OF THE FIND

RECORD CHART

IMPORTANT MEN IN ANTHROPOLOGY	LOCATION OF SITE	WORK ACCOMPLISHED	DATE OF WORK DONE	HISTORICAL DATE OF FIND OR DISCOVERY

ARCHAEOLOGY OF LATIN AMERICA

This unit is presented as a suggested outline of work on the archaeology of Latin America. A chart of discoveries has been included and some information on the Incas. A complete unit on the Mayas is available upon request.

Archaeologists have presented us with a picture of man's development from a primitive to a civilized culture in Mexico, Central America, and Peru. What "new thinking" about Indians resulted from the books written by such writers as de Landa, Prescott and Stephens? What archaeological information today might surprise us? Are there still "lost tribes of Indians?" These questions and many others can be explored in a study such as this and should lead to a better understanding of today's Latin America.

The story about the recent archaeological expedition to the Baja Caves of Mexico as told by Erle Stanley Gardner in Life Magazine (July 20, 1962) or the story of the decoding of the Maya script as told in Science Digest (August, 1962) should provide means of initiating the unit.

I. The Civilization of the Incas

  A. Physical aspects of the country
  B. Sources of Peruvian civilization
  C. Empire of the Incas 1200 A.D. - 1500
  D. Royal family and nobility
  E. Orders of the state
    1. Justice
    2. Divisions of lands
    3. Revenues and census
    4. Roads and public works
    5. Military policy

  F. Religious life
    1. Dieties
    2. Temples
    3. Festivals
    4. Virgins of the sun and marriage

  G. Education
    1. Ways of communication
    2. Astronomy, mathematics, engineering
    3. Agriculture and foods

  H. Animal life
  I. Manufacturing - tools
  J. Arts, crafts, skills
  K. Architecture
  L. Sites of interest
    1. Sacsahauman, Peru
    2. Cuzco
    3. Machu Picchu

  M. People who helped us know about the Incas
    1 William Prescott (1843)
    2. Hiram Bingham (1911) Yale Expedition
    3. Spanish priests and scholars, soldiers, native chroniclers
    4. Dr. Herbert Spinden, Curator of Primitive Cultures, Brooklyn Museum

II. The Civilization of the Mayas

- A. Geography and environment
- B. Language and population
- C. Physical appearance
- D. Psychological traits
- E. The Rise of Maya city states
    - 1. Populating the New World
    - 2. Beginnings of civilization in middle America
    - 3. The Classic Period

- F. The decline and fall of Maya civilization
    - 1. Collapse of the city states
    - 2. Over population, moral disintegration, emigration
    - 3. Intrusions from the north - Toltecs
    - 4. Centralized government at Mayapan
    - 5. Independent chieftainships

- G. Intellectual and artistic achievement
    - 1. Philosophy and training - Popul Vuh
    - 2. Inventions and discoveries
    - 3. Hieroglyphics and records - Diego de Landa
    - 4. Literature and Art = Chilam Dalam

- H. Religion
    - 1. Gods
    - 2. Temples and architecture
    - 3. Ceremonies and priests

- I. Sites of interest
    - 1. Chichen Itza'
    - 2. Uavactun, Guatemala
    - 3. Copan, Honduras
    - 4. Pyramids and temples, Tikal
    - 5. Stelae
    - 6. Yaxchilán and Palenque

- J. Archaeological authorities
    - 1. J. Eric S. Thompson (10 exploration trips) Carnegie Institute's distinguished archaeologist (1885-1956)
    - 2. John L. Stephens and Frederick Catherwood (1839-41)
    - 3. Alfred Maudsley (1881)

III. The Civilization of the Aztecs (Mexicas)

- A. Geography and climate
- B. Primitive Aztecs - Toltecs - Zapotecs
- C. Royalty and nobility
- D. Government
    - 1. Succession to the crown
    - 2. Laws and revenues
    - 3. Military policies

- E. Religion
    - 1. Mythology
    - 2. Sacrifices - human
    - 3. Temples
    - 4. Ceremonies
    - 5. The Plumed Serpent

F. Attainments
   1. Hieroglyphs
   2. Manuscripts - Nezahaulcoyotl, poet
   3. Mathematics
   4. Chronology
   5. Astronomy

G. Domestic life
   1. Agriculture
   2. Arts, crafts, tools
   3. Fairs, currency, trade
   4. Family life

H. The Golden Age - Tezcucans
I. Tenochtitlán, Montezuma
J. Spanish Conquest
K. Sites of ancient civilization
   1. Tula
   2. Cholula - pyramid
   3. Tenochtitlán
   4. Texcoco
   5. Puebla

L. Archaeologists and historians

	EUROPE		EGYPT	
Before 1700	500 BC Herodotus of Halicarnassus – Father of archaeology Toured and wrote about Mediterranean areas. Published book on antiquities. 1389–1464 Cosino de Medici 1549–1609 Ferdinand de Medici			
	Discovery	Discoverer	Discovery	Discoverer
1700–1800	1797 (England) flint implements	John Frere	1799 Rosetta stone Mouth of Nile	French officer Dhautpoul or Bouchard
1800–1850	1819 Classified ages Stone, Bronze, Iron 1847 Uncovered relics in Somme Canal (Fr.)	Christian J. Boucher de Perthes (Fr.)	1801 Suggested proper names for decoding Rosetta Stone 1802 Egyptian illustrations 1817 Egyptian collector explored tombs 1821 Major Rosetta decoding 1843 Memphis & Thebes 30 new pyramids chronological study	Thomas Young Br Dominique-Vivant Denon (Fr.) Giovanni Betzoni (It.) lived in London Jean Champollion (Fr.) Richard Lespius (Ger.)
1850–1900	1853 Swiss lake villages 1859 Origin of species 1875–1879 Prehistoric wall paintings Roman excavations 1880 Development of arch. tools, craniometer, etc.	Dr. Keller of Zurich excavator Charles Darwin (Eng.) Found in Spain General Pitt-Rivers (Br.)	1850 Valley of the Sphinx, Tombs of Sacred Bull 1853 Egyptology 1881 Deirel-Bahri 40 mummies 1894 Naqada Cemetery Methods of archaeclogy	Auguste Mariette Karl Heinrich Brugsch (Ger.) Emil Brugsch (brother) Sir Flinders Petrie
1900–1930	1901 Cave artis. critical observation	Abbe Henri Bre	1922 King Tutankhamen	Howard Carter Lord Carnarvon
1930–1950	1930's London Institute of Archaeology organized 1939 Anglo-Saxon ship, Sutton Hoo, Eng. 1940 Cave pictures (camera) 1947 Radio-active carbon dating	Sir Mortimer Wheeler Basil Brown (Br.) Frederick Windels (Fr.) William F. Libby (US)		
1950–	1958 Oreopitheous oldest skeleton known	Coal miners in Italy		

BABYLON		GREECE AND ROME		FAR EAST	
				Stories of China	Marco Polo
Discovery	Discoverer	Discovery	Discoverer	Discovery	Discoverer
		1748 Pompeii	Italian farmers		
		1750 Greece drawings	James Stuart (Br) & Revett		
		1760 writer on antiquities	Winekelmann (Ger)		
1802 deciphered cuneiform	Grotefend (Ger)				
1842 Mesopotamia Nineveh, Khorsabad	Paul Betta (Fr)				
1845 Mesopotamia (Nimrod)	Sir Austen Layard (Br)				
1846 Better cuneiform	Rawlinson (Br)				
				1863 Prim.man India	Bruce Foote (Br)
1867 Nineveh ½ of library Layard missed	Hormuzed Rassan (Mosul)				
1872 Story of the flood Gilgamesh epic	George Smith (Eng)	1871 Site of Troy	Heinrich Schliemann (Gr)	1873 Anc.Civ. Harappa (W.Punjab)	Alexander Cunningham (Br)
		1875 Sacred Grove Olympia	German archaeologists		
1877 Excavations in Chaldea(Sumerians)	Ernest de Sarzeo (Fr)	1876 Royal Tombs Mycenae	Heinrich Schliemann		
				1891 Java man	Eugene Dubois
1899–1914 Babylon New standards for thoroughness in excavation	Robert Koldewey & Walter Andrae				
1922–1934 Ur methods of preserving	Sir Leonard Woolley (Br)	1900 Knossos capital Minoan civilization Crete	Sir Arthur Evans (Br)	Mongolian discoveries	Roy Chapman Andrews
				1921 seals(Pak)	Banerji (Ind)
				1921 Harappa India	Daya Ram Sahni
1926 Royal cemetery at Ur in Iraq	Woolley	1907 Greek galley of treasures	French divers	1927 Peking Man	Davidson Black (Canadian)
				1928 Anyang China writings back to 1500 BC	
1947 Dead Sea scrolls near Jericho	Arab shepherds	1940's deciphered Cretian language "The Everest of Greek Archaeology"	Michael Ventis (Br)	1925–1931 new finds Karachi(Pak)	Sir John Marshall(Br)
				Siberian Burial chambers 2000 yrs. old full-clad people artifacts (pile rug)	Siberia archae-ologists
				1940's Sind & Baluchistan (Copper-stone civ.)	Sir Mortimer Wheeler(Br)
1951 Jericho oldest community	Kathleen Kenyon				

LATIN AMERICA

	DISCOVERIES	DISCOVERER	DISCOVERIES	DISCOVERER
1550-1600	1566 Report on the affairs of Yucatan	Bishop Diego de Landa	1569-first version of book on the Aztecs, the most important source for the cultural history of old Mexico.	Bernardino de Sahagún (Mexican)
1700-1750	1701-03 Popul Vuh, the sacred traditions of the Quiché Indians.	Father Ximénez		
1750-1800	1787 first investigations of the ruins in Mexico (published in 1822)	Antonio del Ríos		
1800-1850	1831 first volumes of the Antiquities of Mexico.	Lord Kingsborough	1832-36 Mayan pyramid of Uxmal is named after Lord Kingsborough.	Count Waldeck
	1839 rediscovery of Maya sculpture.	John L. Stephens & Frederick Catherwood (American)	1843 wrote books: History of the Conquest of Mexico; Conquest of Peru.	W. H. Prescott
1850-1900	1861 notes of Diego de Landa which provided a tentative understanding of Mexican hieroglyphs.	Brasseur de Bourbourg (Spain)	1881 seven expeditions brought original works of sculpture, cast & stucco relief.	Alfred Maudsley (English)
	1887 contributed knowledge of religion, the languages & art of Central America.	Edward Seler		

SOUTH AMERICA

	DISCOVERIES	DISCOVERER	DISCOVERIES	
1900-1950	1912 (Yale Expedition) discovers the old Inca fortresses of Machu, Picchu, and Vitcos.	Hiram Bingham	1926 investigates Mayan cities, especially Uaxactun	Oliver G. Ricketson
	1931 discovers Mounte Alban near Oaxaca, the richest gold treasure ever found in Middle America.	Alfonso Caso (Mexican)	1949 begins excavations at the Temple of the Inscriptions at Palenque. First proof of Mayan pyramids, like the Egyptian pyramids, could be used as mausoleums.	Alberto Ruz (Mexican)
1950-	1950 continuation of the work of Seler, retranslating the greater part of Sahagúns Historia.	Leonhard Schultze-Jena	1950 books published: Maya Hieroglyphic Writing 1954 The Rise and Fall of Maya Civilization	J. Eric S Thompson (American)
	1962 Baja Caves - Baja California, Mexico. Cave paintings of a lost race of Indians who lived 500-600 years ago.	Clement Meighan, UCLA anthropologist leader of expedition. Discovered by Erle Stanley Gardner	1962 Decoding of Maya hieroglyphs	Dr. Sobolev (Russian)

INCA EMPIRE

TRANSPORTATION

Four great roads led out to the four provinces of the Inca Empire. These roads were paved. From these main highways, other excellent roads led to all parts of the empire. In some places, they were built above the ground because of the marshy land; in other places, they were cut out of solid rock.

The people of the Inca Empire were skillful bridge builders. Some bridges spanned deep chasms in the highlands or crossed swift running rivers. Vines or willow branches were gathered and braided and rebraided until the rope was as large as a man's body. With these huge cables secured into place, a suspension bridge was made.

Travel was by foot, for there were no wheeled vehicles. The SAPA INCA was carried in a litter. Llamas were the means of transporting commercial goods.

RECREATION

There were many festivals and holidays. There were three holidays and three market days each month. All the people were expected to take part in the holidays and market days.

The Festival of the Sun was the most important of the days set aside for recreation. People came from every part of the Empire. Their costumes were of brightly colored, finely woven cloth, and their robes were made of feathers. Flutes and drums made music for the dances.

The month after the planting season, a great festival was held at Cuzco. Prayers were offered for health and good forture. Four hundred nobles took part in the ceremony, as well as many warriors. The people danced all night and the next day was set aside for gladness and good will.

Another festival was held when the young nobles were given the same privileges as the older men. It was like graduating from school. The boys had to pass examinations. Then there were ceremonies in which the boys received men's clothing and weapons. Dancing and contests concluded the celebration.

RECORDS AND COMMUNICATION

No written records were kept by the Incas, as they had no way of writing their language. The Incas knew that memorizing the history of their people was not easy; so they had men trained to memorize the stories of their country and relate them to others. Sometimes the stories were made into songs.

The Incas used knotted cords for counting and keeping records. They added and multiplied by these knots. Knotted strings were used to remind them of important events, much as some of the Indians of our country used wampum. The color as well as the knots had a meaning. A red thread tied above a knot meant war, and a white one meant peace.

By tying knots in the cords, the Incas made thousands of records. The cord on the right was for figures from 1 to 9. The middle cord was for figures from 10 to 99. The left cord was for numbers from 100 to 999. The Incas used this system to record the number of bushels of corn, number of llamas, and number of people.

Stone pillars were set up to keep track of the seasons. There were sixteen pillars near Cuzco. Eight of these pillars were east and eight were west of the city. The ground around the pillars was leveled and paved. Lines were marked on the pavement. In the top of each pillar was a round hole to let sunlight through. By the light and shadow on the pavement, the people could tell the time of the year. Their year was much like ours, being divided into twelve months.

The Incas used runners to carry messages from one part of the nation to the other. A swift runner would run many miles until he came to a relay station; then another runner would relieve him.

Today, we can read much of the story of the everyday life of the people of the Inca Empire through the designs of their textiles and pottery. Some designs show people at work planting crops, harvesting crops, hunting and fishing. Other designs show the nobles traveling in chairs carried on the shoulders of strong men. Still other designs show the people at their festivals, dancing, and playing musical instruments.

EDUCATION

The children of the nobles were educated. Classes were taught by a priest who trained students in law, government, science, religion, poetry, music and chronicles of the heroes. The students were also taught how to read the knotted cords that the Incas used for counting and keeping records.

The children of the common people were taught the occupation of their fathers.

Teachers were provided by the government to help the farmers. They told the farmers what plants to grow in each king of soil, how to irrigate, and how to build gardens on the mountain sides. Trained men also showed the people how to spin and weave skillfully.

WORK

Everyone worked in the Inca Empire except the very young and the old. They did not waste food, clothing, or time.

The people were excellent farmers. In order to make more land, they terraced the mountainsides. Great retaining walls, eight to fourteen feet high and three to four feet wide, were built. The stones of these walls were carefully fitted together to leave no space between. Baskets were filled with soil from the valley and carried up the steep slopes and the terraces were filled in. The Incas built great aqueducts and brought mountain streams down to irrigate the fields. Corn, potatoes, and a grain like buckwheat were the basic crops.

There were miners among the Incas. It took many men to mine the metals used in the temples. The miners were drafted from their villages to work in the mines. They were not kept long at this occupation, as mining was considered to be very hard work. After a few months in the mines, one group of men would be allowed to go home and others would be sent to replace them. The miners were not paid in money, but were fed and clothed.

In addition to farming and mining, each family wove its own cloth, made shoes or sandals and pottery dishes. Wool and cotton yarn, leather, and clay were distributed to the families by the government.

CLOTHING

The people of the Inca Empire wove their own cloth. They were skilled at spinning and weaving, and their textiles are considered to be some of the finest in the world. Coarse cloth was woven from yarn made from the wool of the llama and the guanaco. The wool of the alpaca and vicuna was used to make the very fine clothing worn by the INCA, the royal family and the nobility.

The men wore a tunic without sleeves. A mantle was worn over the shoulders, knotted at the chest, or around the waist. A pouch was carried on the left hip. This pouch was held in place by a long strap which rested on the right shoulder. Accessories included arm bands of gold and silver, headdresses of finely braided or woven bands, supplemented by fringe, feather work, or gold or silver.

The women wore a large rectangular piece of cloth bound around the body just under the arms. It was held in place by pins. The length came either to the calf or to the feet. Sometimes a narrow girdle of bright colors was worn. The women also wore a mantle which fastened with a pin.

Headdress designated rank, sex, or vicinity in which one lived. A gay headdress was the badge of the Imperial Office of the SAPA INCA. This was a thick band of vari-colored material wound around the head several times. The upper-class women wore on their head a piece of cloth which was folded lengthwise three or four times and then fastened to the hair in such a way that one end hung over the forehead and the other covered the top and back of the head. Headdresses that designated from which part of the country a person lived in were caps of wool, headpieces of short ropes with longer strands which hung to the knees, or a hat which looked like a little sieve and covered only the top of the head.

HOUSES AND BUILDINGS IN THE INCA EMPIRE

The Incas were excellent engineers and architects. Many of the buildings they erected centuries ago are still standing. Stones weighing as much as a ton were used in some of them. They did not use mortar or cement, but the stones were polished and ground to fit the space designated. Some are so close together that not even a knife blade can be pushed between them. Ruins of the Temple of the Sun can be seen in Cuzco today. This temple was originally elaborately decorated with gold.

The houses of the people of royal blood were beautifully built and richly decorated. The houses of the peasants were made of adobe, thatched with straw. These were well-made and the thatch was so skillfully placed that it looked like the stone roofs of the houses of the wealthy.

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Oceanography

This is known as the Space Age. It might also be called the Ocean Age. While some scientists are probing and searching outer space, others are probing and searching the bottom of the ocean. Oceanography is a fascinating study incorporating many fields of research.

This unit is planned for use with gifted children as an extension of their regular classroom studies. Plant and animal life in the ocean is not stressed as this is covered in the regular classroom. It is suggested that certain areas of this study are worthy of extended work, such as, Origin of the Ocean: Surface Features Under Water: Content of the Ocean: Waves, Tides, Currents; Evolution of Oceanography.

Exploring the Ocean
A Study of Oceanography

UNIT OUTLINE

I. Origin of the Ocean
   How the continents and ocean basins grew
   How the oceans were filled
   Amount of time needed

II. Surface Features of the Ocean
   Ocean and land areas
   Ocean friend and foe

III. Under Water
   Valleys and mountains
   Temperature
   Pressure

IV. Waves, Tides and Currents of the Ocean
   Causes
   Effect on sea life
   Effect on land

V. Content of the Ocean
   Chemicals
   Minerals
   De-salted water

VI. The Evolution of Oceanography
   Early studies and use
   Value and need of recent and continued study
   Instruments and vehicles

I. Origin of the Ocean

Scientists do not all agree on how our earth was formed. Some think that the earth built up gradually bit by bit from particles that came from outer space, like shooting stars or meteors. Most scientists believe that our earth was originally a hot swirling mass which broke loose from the sun. As it cooled, it shrank like a baked apple with wrinkles and folds in the skin. The larger folds became the continents and the hollows, the beds for the seas. They believe that the heavier materials, or rocks, sank deeper into the earth's soft crust to form the hollows and the lighter rocks rose to the surface.

Another theory is that part of the earth's crust was ripped away and formed the moon. This hole gradually filled with condensed water vapor to form the ocean. Through a series of cracks and breaks, the land masses separated into the various continents and gradually drifted as the basalt layer beneath them was not yet cooled and hard. As the layer hardened, the continents stayed in place. Recent evidence tends to support a theory that the continents are still adrift.

Where did the water come from? Some scientists believe that water formed, and is still forming, deep down in the earth. We know that water is made up of hydrogen and oxygen. As these two gases unite down among the rocks of the earth, they form water. It comes to the surface in springs and volcanoes.

Other scientists believe that as the earth formed, there were dense clouds in the sky above it. As these cooled, it rained and rained, filling up all the low places or seas.

II. Surface Features of the Ocean

Nearly three-fourths of the earth's surface is covered by water. This area of water is divided into five oceans plus many seas, gulfs, bays, etc.

The Pacific is by far the largest, reaching nearly half way around the world. It is also the deepest. The name Pacific means "Peaceful" and was given to it by Magellan on his first expedition around the world. It lies between the two Americas on one side and Asia and Australia on the other.

The Atlantic Ocean was known to the Ancient World. It was named in honor of the strong giant, Atlas, by the Greeks. It is the second largest in size, containing about half as many square miles as the Pacific. It is situated with Europe and Africa on one side and the Americas on the other.

The third largest, the Indian Ocean, lies south of Asia and between Africa and Australia. The Antarctic is next in size and lies around the continent of Antarctica and the South Pole. The area above the North Pole region is covered with the Arctic Ocean. There is no continent and it is nearly as large as the Antarctic. Much of it is frozen.

The land and water line is constantly changing. Land is cut away as waves wash into shore. The dirt or sand may pile up, forming a bar out away from the land. This creates a basin between the land and bar. The basin may fill in too and create an entirely new shore line. Waves make sea cliffs and caves and cut out islands from the shore. Waves may straighten out irregular shore lines or fill up harbors so that they can no longer be used.

Land also sinks and rises. Most of North America was once under water. There is a legend of a continent called Atlantis which is supposed to have sunk into the sea. The Rocks of St. Paul, half way between Brazil and Africa have frequently been named as the remains of the lost Atlantis.

Scientists believe that at one time North America was joined to Asia. Then the Indians, who were our first settlers, could cross Bering Strait on dry land. The Aleutian Islands form a chain of land there now.

III. Under Water

Long ago people thought the bottom of the ocean was flat. Deep sea explorations have revealed that there are very interesting formations. Stretching out from the land is the continental shelf. It usually continues out from 10 to 200 miles from the shore and slopes gradually downward to a depth of 200 to 600 feet. This area contains varied marine life and it is here that oil wells are drilled beneath the ocean.

At the edge of the continental shelf, the land drops suddenly to the deep ocean floor. The average drop is 12,000 feet but in some places it reaches 30,000, higher than the highest mountain on earth. There are canyons with steep cliffs and valleys cutting back into the continental shelf.

The abyss or deep part of the ocean covers over half of the earth's surface. The deepest known is about seven miles, but it may go deeper in unexplored areas. The floor of the ocean is covered with a thick layer of ooze, a mixture of mud and the remains of plants and animals that drift downward in the sea. Scientists used to believe that no life could exist in these depths. Underwater explorers have found a variety of creatures. Besides the plankton, like that found on the continental shelf, there are many different kinds of fish with cold light like fireflies that they can turn off and on. There are also varieties of shrimp and squid. The deep sea offers hope for links with the past. In 1938 a collacanth was caught that is one of an ancient group of fishes that first appeared in the sea about 300 million years ago. It is supposed to have been extinct for 60 million years.

Steep mountain ranges rise from the ocean floor. The Mid-Atlantic Ridge begins at a point about as far north as Iceland and extends southward toward Antarctica for more than 10,000 miles. The mountains extend upward in the ocean from one to two miles above the ocean floor. It rises above the water to form the Azore Islands, with the highest nearly 8,000 feet above water on the island of Pico. There are other mountains in the ocean that are flat-topped like the mesas of New Mexico. They are thought to be very old because of their worn-down tops.

Underwater plateaus may be found in the ocean, too. Some people have thought that they were continents that have sunk. One great plateau extends across the Indian Ocean from India to Antarctica. Some scientists believe that southern India and the island of Madagascar were parts of this sunken continent. Another vast plateau stretches beneath the Pacific from Antarctica to Central America. Some of the smaller plateaus under the ocean are called banks. The Grand Banks off the coast of Newfoundland is a well-known fishing ground. They are larger than Newfoundland itself. The Dogger Bank in the North Sea is another fishing bank. Stone tools and weapons have been dredged from it showing that men once lived there when it was dry land, long before written history began.

The ocean also has deep valleys and gorges. The deeper valleys are called troughs, trenches or deeps. They are usually found quite near the land. The Pacific has the deepest trenches yet discovered. One lies off the coast of Japan, another in the Philippines and the deepest yet reported is near the island of Guam.

There are underwater volcanoes that are extinct and some that are active. When they grow so high that they push their summits above the water, they are called volcanic islands. Bermuda and the Hawaiian Islands rise nearly 30,000 feet from the floor of the ocean which makes it higher than Mt. Everest. However, it is only 14,000 feet above the surface of the water. When volcanoes errupt under deep water, the weight of the tons and tons of overhead water prevent steam from being formed but may create huge waves.

Water temperatures vary in different areas or regions. The polar seas have temperatures of 28° F. (at which water there freezes) while it is a warm 96° F. in the Persian Gulf. In most places in the sea, the temperature steadily decreases all the way to the ocean floor. There it falls below the freezing point but the high salt content in the water and the great pressure at the bottom of the ocean prevent it from freezing.

Beyond about 1900 feet, the ocean is completely dark. Explorers have reported that in descending into the depths, the warm colors of the spectrum (first red and then yellow) fade first at about 300 feet. Green disappears next and at about 1000 feet only a strange, blue light remains. It grows increasingly dark until nothing is visible.

Air pressure at sea level is 14.7 pounds per square inch. Thirty-three feet below the surface the pressure is increased by another 14.7 feet, or "one atmosphere". At sixty-six feet, pressure is trippled; at ninety-nine feet, quadrupled. At half a mile down there is a pressure of about half a ton per square inch.

IV. Waves, Tides and Currents of the Ocean

Surface waves are usually caused by wind blowing across the water but may be due to rivers emptying into the ocean, heavy rains or the unequal heating of the ocean waters. The strength of the wind, how long it blows, the distance it may blow without obstruction and the depth of the water determine the size of waves. Short choppy waves are usually formed locally.

Great swells have usually traveled across many miles of open sea. Tsunami, commonly called tidal waves, are caused by earthquakes under the sea. Preceding a tidal wave, the water withdraws way out from the land leaving bare a large area along the beach that is normally under water. History reveals many disasters of these destructive waves.

Wave motions pass through the water but there is little or no movement of the water itself. The top of the wave is called its crest. The hollow between two waves is called the trough. The distance from trough to crest is the height of the wave. Waves in mid-ocean may be 20 to 25 feet high or go as high as 40 feet in a gale. Waves of 112 feet have been reported but are unusual. The speed of an ordinary wave is about 15 miles per hour but a tidal wave may travel at speeds up to 700 miles per hour. Another measure is the interval, or distance between waves.

As waves approach the land, they crowd together. Waves "break" or tumble forward where the troughs of the waves hit the shallow shore. Waves breaking on the shore have tremendous power. One twelve feet high may strike with a force of more than a hundred tons for every foot of its length. In the English town of Wick a great block of cement weighing 2,600 tons was clamped to solid rock by iron rods three inches thick to form a breakwater. It was torn loose by the waves in a storm in 1877. It is easy to see how land along the ocean may be washed away and coast lines change shape under such terrific force of water.

Hurricanes in the Atlantic and typhoons in the Pacific are whirling storms around a calm "eye". There are howling winds, violent waves and heavy rain.

Tides are caused by the gravitational pull of the moon and the sun. The moon has the most influence as it is the closest. When the moon is new or full, the sun and moon are in a direct line and have the greatest pull. This produces the highest tide called the spring tide. Neap tide, or low tide, occurs when the moon, earth and sun form a triangle. This position is when the moon is at its first and third quarter.

The tides are also influenced by the shape of the sea floor and the local features of the coastline. In mid-ocean they may rise and fall only a foot or two. In many bays and inlets the difference may be many feet. The highest tides in the world sweep into the Bay of Fundy in Nova Scotia. There they rise more than fifty feet. The Bay of Fundy is shaped like a funnel. The water pouring into this funnel is driven into a narrow space so that it rises higher and higher.

Air pressure has some influence upon the tides. When the barometer falls, the tides may rise because there is less pressure on the water to hold it down. Strong winds may produce a high tide, too. With all the variables, tides are complex. They are constantly changing from place to place and from one time to the next.

Ocean currents are caused by changes in temperature and density of the water, the directions of the winds and the turning of the earth on its axis. The main currents of the sea are closely connected with the prevailing winds. Near the equator the air gets hot and rises. Cooler air from the north and south rush in toward the equator to take its place.

As the earth spins, it deflects the moving air toward the west creating a clockwise movement north of the equator and a counter-clockwise movement south of the equator. Surface currents of the ocean get energy from these winds. The currents are changed from their straight course by land masses which cause them to turn and branch out. These currents are like streams or rivers flowing through the ocean and become great modifiers of climate.

Sometimes two currents, one cold, the other warm, converge along a sharp line, easily visible on the sea surface and noticeable by the sudden change in temperature and in animal and plant life. There is an example of this off the coast of Newfoundland where the cold Labrador current meets the warm Gulf Stream.

V. Content of the Ocean

The sea contains a great quantity of wealth. Of the many chemicals in the sea, sodium chloride (common salt) is the most concentrated. There is enough salt in the oceans to cover the whole United States to a depth of one and one-half miles. Each cubic mile of sea water contains about 143 million tons of common salt. In some countries, men still get their salt by allowing the ocean water to flow into shallow pools and then letting the water evaporate. Salt is left. Because of the high salt content, sea water can not be used for irrigation or drinking. So far, large scale distillation has proved impractical. The salt content in the water is one way of telling the age of the ocean. The water evaporates leaving the salt behind. As more water is added from streams, more salt is added and the ocean continues to grow more salty as it grows older. Seas vary in their amount of salt. The Red Sea is the saltiest.

Scientists have been able to find about fifty of the known elements in the ocean by special techniques of chemical analysis. A cubic mile of sea water has about nine pounds of gold and about the same amount of silver. This would be about 3 billion pounds in all the oceans. So far, the cost of extracting the gold costs more than the value of the gold. Iodine is also present in sea water but it is cheaper to harvest seaweed that gathers iodine than to take it directly from the water.

Some minerals can be extracted from the water on a commercial basis. One of these is bromine which is used in the manufacturing of photographic plates and films, making ethyl gasoline and certain drugs. Nine-tenths of all the bromine in the world is in the sea. There is a plant at Freeport, Texas that extracts bromine from the water. They take more than a pound of bromine from 2,000 gallons of sea water. Magnesium is a valuable light weight and durable metal used in making airplanes. Each cubic mile of sea water contains 4 million tons of magnesium. Sea water is drawn into reservoirs where oyster shells are piled. The magnesium in the water joins the lime in the oyster shells and is separated later. Over 500 different things are made out of minerals from the sea.

Besides mineral wealth in the ocean, there are other things useful to man. Some seaweeds are used for fertilizer. Potassium is found in the potash of burned kelp. Dulse is eaten in the United States and Irish moss in Scotland. Some thirty different kinds of seaweed are eaten in all. It is the only vegetable of the Eskimos. Some Indians of South America are kelp eaters.

VI. The Evolution of Oceanography

Although oceanography is our youngest science, it has come a long way from the early theories that the earth was flat and the sea full of monsters. Probably the first people to sail the open seas were the Polynesians who inhabited the island of the South Pacific. Long before Columbus made his daring voyage, the Norsemen were experienced sea travelers.

Early European seamen used the sextant and chronometer to determine their position. By using the sextant they could find the height of the sun above the horizon and determine their distance north of the equator (latitude). The chronometer told the time in Greenwich, England and by comparing this with the local time, they could find out how far they were from Greenwich (longitude). A compass was in use before the time of Columbus.

The first "sounding" was done by letting a lead weight on a cord down into the water to measure the depth. The nearer they were to shore, the shallower the water. Sometimes the weight was greased so that a sample of the ocean floor was brought up. This sample, plus the depth, helped them ascertain their position. From this method came the term "fathom". They measured the cord by the distance from hand to hand with widespread arms as they pulled it in. The fathom was approximately six feet. Later, steel cable was used instead of cord.

Magellan was the first to try to measure the depth of the water in mid-ocean. He used a 1200 foot rope and when it was completely let out, he assumed he had reached bottom. This mistake was not corrected until 1840 when Sir James Clark Ross continued tying ropes together until the weight actually touched the bottom. This was in the South Atlantic and he found it to be 14,550 feet deep.

In 1807 Jean F. Arrago suggested another method for sounding. His theory was based on the knowledge that sound travels 4800 feet per second under water and by setting off explosions under water, the depth could be calculated by the length of time it took the sound waves to bounce back from the bottom of the ocean. It took some time for his theory to be developed. This method also reveals the depth of the ooze layer. The first return is from the top of the ooze layer and is followed by a second signal from the hard rock. From these figures the depth of the ooze can be calculated and has been found to be thousands of feet thick in some places. Electronic equipment was developed later to transmit ultrasonic high-frequency waves to the bottom and receive the return signal.

Most ocean-going ships are today equipped with electronic depth finders. Some show the return signal by a light on a dial like an automobile speedometer. There is also a more complicated echo sounding equipment which automatically makes a profile map of the sea floor. It shows underwater terrain and location of wrecks.

The English ship, the Challenger, was the first ship equipped for oceanographic exploration. In 1872 it sailed around the world taking samples of ocean life. This definitely proved that life did exist in the depths of the ocean where scientists had previously thought it impossible.

There were early attempts to make a submarine such as van Drebbel's leather-covered row boat built in 1620. It went down 10 to 15 feet below the surface of the water. Robert Fulton built a 21 foot copper-covered submarine in 1800. The first submarine commissioned into the United States Navy was built by a man named Holland and was commissioned in 1900. It was 53 feet long.

In 1931 Sir Hubert Wilkins made the first actual attempt to take a submarine under the North Pole. He had to turn back without completing the mission but did bring back valuable information of the part he explored.

Nuclear-powered submarines opened new possibilities of underwater exploration. Conventional submarines operate on a battery and must surface frequently to re-charge. A nuclear-powered submarine can stay submerged for many days and it also travels faster.

The nuclear-powered Nautilus, commanded by William R. Anderson, successfully passed under the North Pole. They found daggers of ice coming down more than 125 feet. A sonar eye on her bow warned of obstacles ahead. They were equipped with echo-sounding instruments with twin pens which recorded the profile of the sea bottom as well as the underside of the ice. A closed-circuit television set, mounted topside gave the view of the underside of the ice floes, and when it showed water above, it was safe for them to surface. In some places the water was quite shallow. In one place there was only 45 feet of water below the keel and less than 25 feet of water between the super-structure and the ice above. At the North Pole the depth was 13,410 feet which was about average for the area. They found and charted mountain ranges thousands of feet above the ocean floor. Submariners now use these charts to check their position. This voyage supplied more than 10,000 figures on the depth of the water, temperature of the water, thickness of the ice, etc.

In 1934 William Beebe and Otis Barton established a record by descending 3,028 feet into the sea near Bermuda in the first bathysphere. At this depth the pressure on the steel ball was 7,016 tons. The bathysphere was lowered from its mother ship on a single non-twisting steel cable. The sphere weighed 2½ tons. Its walls were 1½ inches thick and the interior was only 54 inches in diameter. Dr. Beebe reported that at 700 feet below the surface he opened a book and couldn't tell which pages contained colored pictures and which printing. The illumination was "stranger than any imagination could have conceived--an indefinable translucent blue quite unlike anything I have ever seen in the upper world." Farther down the water appeared to be a "cold, whitish grey", and deeper yet "a blackish blueness". In 1949 Beebe went down 4,500 feet off the California coast in a benthoscope, a 3½ ton steel sphere 47½ inches in diameter. One of its windows was designed to take movies.

Professor Auguste Piccard designed the first bathyscaphe (which comes from two Greek words, "bathy" meaning deep and "scaphe" meaning boat), in the late 1930's. This was a considerable improvement due to the fact that it was not dependent on cables from a mother ship but could raise and lower independently. It was designed like a blimp with a sphere-shaped passenger compartment of forged steel beneath. It was completed in 1948 and in 1954 established a new record of man's penetration into the sea by descending 13,287 feet near the north coast of Africa. Later Professor Piccard built the Trieste, which was purchased by the United States in 1958. In 1960 Lt. Don Walsh and Piccard's son Jacques went to the floor of the Marianas Trench--35,800 feet. This is located in the Pacific about 250 miles from Guam and is thought to be the deepest of all oceanic chasms. The pressure there is 7 tons per square inch.

Underwater problems of air, visibility and pressure prevent man from descending as far by diving, but considerable salvage and research work is done by divers. Helmet divers are supplied with air from the surface and can usually work in deeper water, and stay on the bottom longer than scuba divers. Scuba divers (self-contained underwater breathing apparatus) wear tanks of air on their backs and ordinarily swim in more shallow water. William Bollard, a British helmet diver, made a record by going down 535 feet. When man is under pressure, nitrogen is not exhaled but remains in solution in the blood. If he makes too rapid ascent to the surface the nitrogen in his body may kill or cripple him. This is Caisson disease or commonly called "the bends".

The structure of the sea bottom is mapped by what is called a seismic survey. This is done by exploding charges of dynamite which creates an artificial earthquake. Shock waves are known to travel at certain speeds through various materials, so by tracking, the layers can be discovered.

Scientists were puzzled for some time by a transcient false bottom in parts of the ocean. It is now known as the "deep scattering layer", and is thought to be a concentration of sea life which congregates where food is abundant. It is nearer the surface at night than during the daytime.

An instrument known as a "corer" is used to bring up samples of the ooze deep in the bottom of the ocean. It is a steel tube 70 to 80 feet long loaded with weights to force the pipe into the bottom (some have a piston). A great deal of history can be determined by this method. Because sediment builds up slowly--sometimes less than a quarter of an inch in 1000 years--a core sample may trace back to early history. Scientists have discovered that there were alternate periods of freezing and warming until 9000 years ago. Since then the temperature has stayed about the same.

"Nansen bottles", or reversing bottles, are used to get the samples from various depths so scientists can analyze the chemical composition, temperature, and the vegetable and animal life. The metal bottles are cylinder-shaped, both ends have seals that can be closed automatically. A number of open bottles are strung at a distance on a wire cable. A lever causes the bottles to close and turn over. This traps a sample of water at each depth. At the same time, the mercury column in an attached thermometer breaks and so records the temperature.

A "grab" is used for comparatively shallow sampling. This instrument is lowered into the water. Two big jaws clamp together from the impact and take a scoop of material. Another device samples plankton in between layers of very fine gauze material. Many experts in the field of oceanography work in laboratories ashore analyzing and developing scientific discoveries.

A most interesting discovery was made by a young scientist, Townsend Cromwell, of a submarine river in the Pacific. It is 900 feet deep, 180 miles wide, 5400 miles long and its course exactly follows the equator with no bends or turns. It starts at the International Dateline and suddenly stops at the Galapagos Islands. There is a mound along the line of the geographic equator that has been tracked one-fourth the distance around the equator.

Wreckage has been discovered under water that dates back 33 centuries ago and contains valuable artifacts of the time. Divers have searched for wrecks and have brought up valuable cargoes of gold.

A project is being planned to bore a hole through the layers of sediment and the underlying layer of bedrock in the bottom of the ocean in hope of piercing the area called the Moho (technically called the Mohorovicic Discontinuity). Moho is the area between the earth's crust and mantle. The crust is thinnest under the sea (in places 2½ miles as compared to an average of 20 miles under the continents).

Oceanography is one scientific field with cooperation among nations. Experts from other countries may be invited to join an expeditionary party. The International Oceanographic Congress was organized to aid the exchange of information.

Concepts and appreciations to be developed:

1. Water covers nearly three-fourths of the earth's surface.
2. Scientists do not agree on the origin of the earth and the oceans.
3. The five oceans according to size are: Pacific, Atlantic, Indian, Antarctic and Arctic.
4. The water in the oceans has great power and force. Coast lines may be changed and much damage done by the impact of the waves.
5. The temperature of the ocean varies from the surface to the bottom and from the equator to the poles.
6. The ocean consists of three areas: the continental shelf, a steep slope or cliff and the ocean floor.
7. The ocean floor is covered with a thick layer called "ooze" which accumulated from plant and animal remains.
8. The ocean is not level on the bottom but has mountains, plateaus and trenches.
9. The bottom of the ocean is cold and dark.
10. Pressure under water increases with depth.
11. No plants can grow in deep water because they must have light.
12. Water is not displaced by waves; the motion passes through it.
13. Tides are caused by the gravitational pull of the moon and sun on the water. The moon exerts the greater influence because it is so much closer.
14. Salt content in the ocean varies. The ocean continues to grow more salty as water evaporates and more salt is added.
15. Magnesium and bromine are important minerals taken from the sea.

16. The ocean contains many minerals, including gold and silver, but most of them can't be extracted profitably.

17. Man makes use of the sea for food.

18. Ocean currents are related to higher temperatures near the equator and prevailing winds.

19. Man has continually improved on previous knowledge to conquer the depth and breadth of the ocean.

20. Information obtained from the sea contributes to the knowledge of the history of the earth and the history of man.

21. Man is making progress in his knowledge of the sea but there is much yet to know.

22. Scientific exploration is an important part of our way of life and we should be curious and aware of what is being done in the field of oceanography.

23. Many people work "behind the scenes" of each exploration. The various jobs require many people to help carry on research.

INITIATING ACTIVITIES

Read some of Beebe's descriptions of what he saw in Half Mile Down.

Have a series of port hole peep boxes demonstrating ideas of what the ocean is like--treasure, mermaids, complete darkness, odd fish, giant seaweed, etc.--with the caption "What's at the bottom of the sea?"

Arrange an attractive bulletin board of pictures and/or book jackets about the sea.

Display chart, "The Sea". (Vol. 16, No. 24 available from News Map of the Week, Inc., 1512 Orleans St., Chicago, Ill. $1)

Make a display of various books on oceanography on the reading table.

Exhibit newspaper and magazine clippings on the bulletin board which tell of recent findings.

DEVELOPMENTAL ACTIVITIES

Make charts showing: comparison of land and water on the earth; cut-a-way of ocean--continental shelf, cliff, floor; sea measurements--nautical mile, fathom, knot, atmosphere.

Prepare reports on: The Skate, the Nautilus, the Triton, the Trieste, William Beebe, Willm and Houot, Cousteau, Woods Hole Oceanographic Institute, Scripps Institution of Oceanography, Maelstrom, Sargasso Sea, Lost Atlantis.

Locate on the globe: Marianas Trench, Azore Islands, North Pole, Hawaiian Islands

Visit a diving equipment shop.

Interview a diver.

Make a tape recording simulating a trip to the bottom of the ocean in a bathyscaphe.

Make a salt and flour map showing the Mid-Atlantic Ridge.

Create a musical composition to portray the deep ocean.

Write a legend of a lost continent. Give it a name.

Make port hole pictures using two paper plates (rims facing)

Simulate a radio interview with Commander Anderson following his trip under the North Pole in the Nautilus.

Make a scrapbook of articles and pictures about the ocean.

Display models of submarines and any other undersea equipment available.

Read books from the bibliography.

CULMINATING ACTIVITIES

Plan a sharing time for each home room. Explain the various things learned and show charts and any other visual aids.

Prepare a "March of Progress" television show illustrating the steps of man's knowledge of the ocean for an assembly.

DEMONSTRATIONS AND EXPERIMENTS

Secure one end of a rope and shake the other to demonstrate how waves pass through the water.

Blow across a shallow pan of water to demonstrate the way wind creates waves.

Boil salt water to evaporate. Add more salt water and observe that although the water goes away, the salt stays in the pan.

EVALUATION

Give a test covering objectives.

Observe pupil interest and curiosity.

Discuss success of each activity attempted.

Informally discuss and criticize the unit together

Give home-room summaries.

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Mathematics

INTRODUCTION

In the introduction to the Tentative Elementary Arithmetic Course of Study (1958) a statement is made to the effect that it is important that a child be kept at the "cutting edge of his knowledge." In order to achieve this objective we need to know the characteristics of good instruction in mathematics, the problem-solving approach to mathematics, and the objectives of mathematics instruction. We also need to know what curriculum adjustments to make for the able student, taking into consideration not only the necessary adjustments in content but also the adjustments in teaching procedures.

CHARACTERISTICS OF GOOD INSTRUCTION IN MATHEMATICS:

Understanding of concepts and generalizations should be the primary goal of instruction.

Students should be provided with many opportunities for problem solving.

The spirit of discovery and adventure should be brought into the classroom by allowing pupils to discover mathematical generalizations for themselves.

More emphasis should be placed upon the process of thinking a student employs while solving a problem than upon the answer itself.

The reasons for studying every mathematics topic should be apparent to the students.

For most students there should be a gradual moving from the concrete to the abstract.

Drill should have a definite place in mathematics instruction, but it should not take place unless:

1. the need for automatic response is justified
2. the pupil sees the value in it for him
3. the pupil first understands the principles and skills involved in the drill exercises

Classroom activities should be selected to allow for a wide range of individual differences.

Each student should study mathematics which keeps him at the "cutting edge of his knowledge."

Emphasis should be placed upon the transfer of instruction in mathematics to other areas.

Students should be motivated so that they accept and grow toward the realization of the objectives of mathematics instruction.

In evaluation, all aspects of mathematics instruction should be measured. Computation is only one aspect; judgments, estimations, meanings, ability to apply, are others.

PROBLEM SOLVING APPROACH TO MATHEMATICS INSTRUCTION:

Students are in school primarily to prepare themselves to solve their present and future problems. Therefore, the major goal of instruction should be the development of a student's problem solving abilities. Often, to the mathematics teacher, problem solving implies story or word problems. However, important as such experiences may be, the contribution teachers of mathematics can make is much greater than this.

A story problem quite often is a problem to the students; so also might be extracting square root, or finding the product of two numbers greater than ten. On the other hand, these situations may not be problems at all. They may already know how to go about finding the answer and the process of finding it is merely a matter of routine.

The type of learning experience which mathematics teachers should provide are those in which students do not have a ready way of reacting. In such experiences students can improve their problem-solving abilities.

It is possible to teach mathematics almost entirely by using a problem solving approach. Such an approach is consistent with the above characteristics of instruction and in addition provides much satisfaction to both student and teacher.

Since problem solving is a major aim of mathematics instruction, it is helpful to know what abilities a person will prossess if he is a competent problem solver. Such knowledge should help the teacher at any grade level plan activities and to aid in the evaluation of student progress.

Listed below are some problem solving abilities teachers at all levels should work toward developing within their students:

RECOGNIZING AND DEFINING THE PROBLEM

recognize problem situations in which mathematics can be used in obtaining answers

diagram, dramatize, and/or construct models of problem solving situations (especially applicable to story problems)

state problem in his own words

recognize problems in which there is not enough information given for solving the problem (insufficient data)

recognize in those problems with insufficient data what data needs to be obtained before the problem can be solved

identify the kind of data needed if the problem is to be solved (relevant data)

display a reasonable understanding of the problem situation before attempting to solve the problem (meanings of terms are known and other concepts involved are understood)

formulate mathematical statements that describe problem situations (including story problems)

4

ESTIMATION AND PREDICTION

make predictions which are neither over-cautious nor over-impulsive

judge the limits between which answers should lie if the answer is to be reasonable

COLLECTING, ORGANIZING, AND PRESENTING DATA

ignore or discard data that is not needed in the solution of a problem

use sources of information effectively for the purpose of finding the needed data

display a questioning attitude toward the data as to its reliability, accuracy, and representativeness

present data in a well-organized way so that it can be easily read

present problem solutions neatly and in a well-organized way so others may easily follow the reasoning involved

PLAN OF ATTACK

find alternative methods for solving the same problem

select the best mathematical procedure(s) that will obtain an answer to a given problem

change a problem whose solution is not known into an analogous problem whose solution is known

work back from a tentative conclusion to the given data in the hope of finding a technique for solving the problem

point out those cues in the problem situations (especially applicable to story problems) which suggest certain methods of attack

find in textbooks and other library resources new techniques for solving a problem

demonstrate mathematical reading skills which will allow him to understand textbook explanations

INTERPRETATION AND APPLICATION

recognize relationships and trends (if any exist) suggested by the data collected

translate mathematical language into language of common usage

interpret the answers of mathematical operations by referring back to the original problem setting

determine when a problem has a reasonable answer recognize those actual problem situations which could make use of acquired mathematical skills and techniques

invent problem situations which can make use of known techniques

SEARCH FOR NEW PROBLEMS

invent new problems by varying in some way the "problems" whose solutions are known

generalize a solution to a problem so as to include related problems

OBJECTIVES OF MATHEMATICS INSTRUCTION

An effective mathematics program should help the individual student:

To develop attitudes essential to democratic living among which would be tolerance, creativeness, self-direction or self-discipline, social sensitivity, and open-mindedness.

To be familiar with concepts and to acquire appreciations and understanding of principles and skills to the point of functional competence in the following broad areas of concern: number, operation, measurement, theory of space (form and position), relationship, proof, symbolism, and problem solving.

To use reflective thinking in the analysis and solution of mathematical problems and to apply similar procedures to non-mathematical situations.

To appreciate the interplay between the development of mathematics and the development of our cultural heritage and to have a realistic but yet optimistic view regarding the contributions to our way of life such interplay will make in the future.

To acquire the vocabulary, skills, and abilities to converse, read, and write clearly and correctly about situations involving quantitative and spatial relations.

To further his previous learning in mathematics by helping him to integrate it with topics he is now studying.

To develop a willingness and ability to apply his learning in mathematics to situations outside the mathematics classroom.

To appreciate the importance of mathematics vocations, professions and many future studies, and to become aware of opportunities which are made available to individuals with various degrees of mathematics competence.

To fulfill his role in society in an intelligent manner, both as a producer and a consumer.

CHARACTERISTICS OF THE MATHEMATICALLY GIFTED

It would be a mistake to consider only those children who test high in numerical computation among the mathematically gifted. There are many students who by conformity, memory and diligence achieve a high degree of skill in numerical computation. These same students may lack completely the ability to interpret mathematical concepts. Neither can tests, valuable instruments that they are, always give us complete or accurate samples of a pupil's ability.

A teacher's judgment based on objective observation techniques remains one of our best guides as to the true capacity level of an individual. Observation of factors, such as the following, reveals the mathematically gifted at the elementary school level:

ability to sense basic relationships and to form generalizations
ability to apply basic ideas and knowledge to new situations
intellectual curiosity and the desire to learn
ability to express ideas and relationships
insight into problems and problem solving
developing good methods and procedures for work in mathematics and other subject areas
sensing the how and why of things
good common sense . . . seeing discrepancies, sensing pertinencies, etc.
facile, accurate work with numerical computation[1]

In writing on the subject of helping the mathematically talented, Weaver has this to say concerning recent research findings:

> While a child with a high IQ is likely to be mathematically talented, it is no guarantee. There are high IQ children not mathematically talented and there are mathematically talented children whose IQ's are not particulary high. On the whole, however, high IQ and mathematical talent generally run together.
>
> When a child has a high IQ and a high level of arithmetic achievement, the probability that he is mathematically talented is much greater than were he blessed in only one of these categories. High-level achievement in arithmetic reasoning - particularly as revealed in mathematical understanding and conceptual learning - is of much greater significance than a high-level achievement in arithmetic computation. A child with a high IQ, high in "reasoning-understanding," is almost certain to be mathematically talented.

Weaver also gives some of the characteristics and behaviors that help us identify children truly talented in mathematics, signs that distinguish them from the less capable. The more of these characteristics a child possesses and the greater the degree to which each is in evidence, the more confident we can be of that child's superior mathematical ability. Some of the more important of these are:

Sensitivity and curiosity about matters of quantity in life about him (including concepts of size, form, shape, position).

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[1] Marguerite Brydegaard, "Creative Teaching Points the Way," The Arithmetic Teacher, Vol. I, No. 1 (February, 1954), p. 22.

Quickness in understanding and dealing effectively with quantity.

Ability to think and work abstractly and symbolically.

Ability to communicate quantitative ideas effectively, both orally and in writing, and, in return, to receive and assimilate quantitative ideas offered by others.

Ability to perceive mathematical patterns, structures, external and internal relationships.

Ability to think and perform flexibly in quantitative situations, rather than in a stereotyped manner, with insight, imagination, creativity, originality, self-direction, independence, eagerness, concentration and persistence.

Ability to think and reason analytically and deductively; ability to think and reason inductively and to generalize.

Ability to transfer previous learnings to novel or "untaught" situations.

Ability to apply mathematical learning to social situations and other curricular areas.

Ability to remember and retain that which has been learned.[1]

WAYS OF PROVIDING FOR THE ABLE AND GIFTED

In working with the more able pupil in mathematics, adjustments should be made in the content, in the instructional methods used, and in the standards of achievement. Although Workshop classes and other types of advanced groups are less heterogeneous than regular classroom groups, there may be considerable variation in mathematical ability. If instruction is not differentiated to fit the characteristics and the needs of the group and the individual child, such grouping would be of little value. If we recognize the sequential and cumulative characteristic of mathematical learning, we must acknowledge the need of rather flexible grade level requirements for effective power or depth learning will undoubtedly produce a certain amount of acceleration.

For our purposes the viewpoint is that we need to select those activities and experiences which are appropriate for each group that we teach. It is then not a matter of enriching the curriculum but planning a different curriculum, one that takes into consideration the characteristics and needs of these children. This curriculum will not only include those topics which extend and build upon the mathematical ideas of the regular program but will also include the development of conventional topics through a more modern approach, the approach that is being developed by various experimental projects and study groups.

The effectiveness of such a program depends upon the experiences provided, the selection of suitable activities, and the attitude and competency of the teacher. We can help our more able pupils through a program based upon:

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[1] J. Fred Weaver, "Helping Mathematically Talented Children in the Elementary School," Updating Mathematics, Vol. 2, No. 7, Sec. II, 1960.

Identifying mathematical ability. Both mathematical understanding and numerical computation need to be considered.

Careful planning and preparing for systematic instruction. The teacher must be concerned about the total mathematics program when selecting activities so that there is a continuity of experience. This requires close coordination in planning if both the classroom teacher and the resource teacher are involved.

Developing creativity. Choose activities that challenge, that lead to the discovery of important ideas, that emphasize the autonomy of the learner.

Solving problems that arouse interest and encourage mathematical thinking. Problems that require first-hand research through gathering, organizing and interpreting data are excellent for this. Emphasis should be placed upon the inquiry process. How the problem situation is chosen and how it is presented to the students are factors which require the closest attention in preparing for the development of the thinking process.

Providing for different levels of operation at which the pupils work. How a child deals with a quantitative situation determines whether he demonstrates power in the activity. This is usually spoken of as depth or power learning.

Helping the learner to discover the basic ideas of mathematics. Developmental activities that require a pupil to discover a fact or a principle, a pattern or relationship between quantities, is the chief means for providing an effective learning situation.

Opening new horizons through the introduction of some of the topics included in recent elementary mathematics programs. Introduction to sets; nondecimal bases; prime numbers and factoring; algebra, geometry; ratio applications, graphs, central tendency; properties of numbers are a sampling of such topics.

Developing a genuine interest in mathematics. If learning is creative and flexible, if emphasis is placed upon basic concepts and relationships, and if learning evolves from discovering basic principles, then mathematics has its own "built in" motivation.

Encouraging such activities as independent reading and reporting on interesting topics. Such activities should be chosen carefully so that they will challenge intelligent, creative thinking and encourage independent study habits.

Using historical materials. Tracing the development of ancient numeration systems, learning about interesting algorisms of the past, learning about early measures and measuring instruments, and reading about dramatic episodes in the history of mathematics, may stimulate an interest in the subject. Such materials are usually most effective with those students who have already developed considerable interest in mathematics.

Providing interesting books on mathematics, teaching models, manipulative materials, and computing devices. The opportunity to construct models and devices (geometric models, abacus, slide rule, Napier's Rods) is also necessary.

Finding social applications of mathematics in community resources, in the social studies, and in science.

Using recreational type mathematics such as puzzles, tricks, number games, etc. This type of enrichment is very popular with children and may be predominantly entertaining unless the activity leads to the development of power in dealing with quantities. Magic squares, Tower of Hanoi, horseshoe problem, "thought number" type puzzles are examples of this type of recreational mathematics.

Evaluating pupil progress. Evaluation should be made on a broad base so as to include not only the growth in computation, but also the growth in conceptual learning, appreciation, and the application of mathematics. These pupils should aspire to high standards in accuracy, work habits, and the development of mature ways of mathematical thinking.

ENRICHMENT

The terms "enrichment" and "level of operation" appear frequently in the literature on teaching mathematically gifted children. These two means for helping the able and gifted warrant our consideration. First of all, the term "enrichment" means different things to different people. Usually enrichment refers to those activities and experiences that enrich the regular mathematics program. More often than not a distinction is made between "horizontal" and "vertical" enrichment, with the latter referring to depth or power learning or level of operation. Such activities as recreational mathematics and reports on special topics etc., are usually labeled as horizontal enrichment. Other typical suggestions made for enriching the curriculum include the following:

Additional exercises and problems, frequently starred because of difficulty.
Vocabulary study.
Individual and group reports on topics investigated.
Finding social applications of mathematics in community resources.
Use of supplementary textbooks.
Mathematics clubs.
Mathematics exhibits and contests.
Making of models and other visual aids.[1]

One writer says that effective enrichment activities vary in form in different ways in the extent to which an experience is predominantly oral or predominantly written, the extent to which an activity is chiefly teacher-directed or chiefly self-administering, or the nature and form of the mathematical content on which activities and experiences are based. He lists these kinds of things as bases for effective enrichment work:

Historical material pertaining to
    number ideas, systems of notation
    written forms of computation (algorisms)
    measures (units of measure and measuring instruments)
"Recreational" mathematics, including
    number games, tricks, puzzles, riddles,
    number pleasantries, oddities, etc.
Computational short cuts and checking procedures (both oral and written).

Alternative patterns of thinking, methods of procedure, etc.
(in examples and problems, both oral and written).

---

[1] Foster E. Grossnickle, "Arithmetic for Those Who Excel" The Arithmetic Teacher,(March) 1956, p. 41.

"Excursions" into simpler forms of more advanced mathematical ideas such as
    notational systems with nondecimal bases.
    properties of number systems (as distinguished from notational systems).
theory of numbers.[1]

Another writer's viewpoint is that every pupil in arithmetic must be provided with some form of enrichment. Enrichment in arithmetic demands the use of manipulative materials and experiences which supplement the textbook. Such activities as library work, research, community projects, participation reports on current items from newspapers, displays for bulletin boards, and work on experience units typify enrichment. Very probably none of these activities can be classified as an experience which helps to further development of power in the use of numbers.

Enrichment may be either horizontal or vertical. The activities already enumerated are typical of horizontal enrichment. Vertical enrichment consists of participating in activities that will create depth of understanding in dealing with numbers. These are the activities that lead to the development of power.[2]

Many of the suggestions given by these writers on the subject of enrichment are included in recently developed mathematics programs. Some of the topics are now considered to be an integral part of the curriculum while others are suggested as enrichment.

LEVELS OF LEARNING

The concept of levels of learning is an important one when dealing with individual differences. Smith says that unless teachers have the concept of various levels of learning and can teach accordingly, grouping is of no great value. The concept of levels of learning recognizes the fact that children of various degrees of ability or maturity can learn to do the same thing on several different levels from the simple concrete to the more complex abstract. When you develop your work on various levels, you have a better chance of interesting all members of your class.[3]

There are numerous descriptions of how to deal with levels of learning. The following references should be quite helpful:

Irene Sauble and C. Louis Thiele, "Guidance and Counseling," Instruction in Arithmetic, Twenty-Fifth Yearbook, The National Council of Teachers of Mathematics, 1960, pp. 162-163.

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[1] J. Fred Weaver, "Helping the Mathematically Talented Children in the Elementary School," Updating Mathematics, Sec. II, Vol. 2, No. 7, p. 2.

[2] Foster E. Grossnickle, "The Arithmetic Program," Curriculum Planning for the Gifted, ed. (Louis A. Fliegler, Englewood Cliffs, N.J.) 1961, pp. 67-70.

[3] Rolland R. Smith, "Provisions for Individual Differences," The Learning of Mathematics Its Theory and Practice, ed. H.F. Fehr, National Council of Teachers of Mathematics (Washington, D.C.) 1953, p. 275.

Harold Moser, "Levels of Learning-Planning Depth," The Arithmetic Teacher, December, 1956.

Foster E. Grossnickle, "The Arithmetic Program," Curriculum Planning for the Gifted, ed. Louis A. Fliegler, Englewood Cliffs, N.J., Prentice-Hall, Inc., 1961, p. 69.

ENCOURAGING CREATIVITY

One of the practical implications of the modern theories of learning for the teaching of mathematics is that creativity is encouraged by helping a pupil discover for himself the basic ideas and that the pupil discovers these ideas through developmental, reflective activities. The element of creativity seems to play an important role in the inquiry process type of learning, which results in the productive thinking in mathematics, is described in turn by various writers as depth learning, meaningful learning, vertical enrichment, power activity, and the inquiry process.

Concerning the development of depth in learning, depth learning in arithmetic is not developed by emphasis upon skills alone. Neither is it developed solely by providing children with "enrichment" activities or with content of a more difficult nature taught at an advanced level. It is developed in quite a different way, that is:

> by confronting the student with challenging problems - but problems within his power of comprehension,
>
> by leading him, from the very beginning, to see the futility of thought without dependable data,
>
> by maturing him in those methods of disciplined thought that have been found to facilitate the work of mathematicians,
>
> by providing opportunities to discover and to find original solutions, and
>
> by steadily encouraging him to new levels of creative thinking.
>
> Depth learning in arithmetic results from a way of teaching which encourages reflective thinking, which permits experimentation, and originality, and which holds steadily before the learner the need for knowing the facts and principles necessary for clear thought. Given these things, children will move on to concepts of greater difficulty and the development of greater skill in handling quantitative relationships.[1]

Another writer says that a pupil learns best when he discovers for himself a fact or a principle. Any activity which requires a pupil to discover a pattern or relationship between quantities presents an effective learning situation in arithmetic. For that reason the use of activities which develop power in dealing with number will be considered effective means of challenging the gifted in this subject. Level of operation implies power in quantitative thinking which does not necessarily characterize enrichment. Experiences that produce power represent enrichment, but enrichment does not necessarily lead to the development of power.[1]

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[1] Charlotte W Junge, "Depth Learning in Arithmetic - What Is It?" The Arithmetic Teacher, (November, 1960), p. 342.

For activities that will lead to the development of creative mathematics see the examples which follow.

EXTENDED TOPICS

Extending a mathematical topic can be interesting, challenging, and informative for an individual child or a group. Examples of this are presented here in some detail.

SEARCH FOR PATTERN

After discussing the meaning of subset, the children were asked to list the subsets of A, B, C . Two boys worked out the chart shown below so it was named the Linden-Baird Chart, using their surnames. Attention was called to pattern in the chart. Multiplication charts for Base 5 and Base 10 were examined for pattern and the question was asked as to why pattern appeared in them. (Commutative property) A generalization was made, a generalization related to the structure of the chart.

	1	2	3	4	5	6	7	8	9	10	11	0	Itself	Total
11	11	55	165	330	462	462	330	165	55	11		1	1	2048
10	10	45	120	210	252	210	120	45	10			1	1	1024
9	9	36	84	126	126	84	36	9				1	1	512
8	8	28	56	70	56	28	8					1	1	256
7	7	21	35	35	21	7						1	1	128
6	6	15	20	15	6							1	1	64
5	5	10	10	5								1	1	32
4	4	6	4									1	1	16
3	3	3										1	1	8
2	2											1	1	4
1												1	1	2

GENERALIZATION: The number of the subsets is equal to 2, to the power of the set number.

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[1] Foster E. Grossnickle, "The Arithmetic Program," Curriculum Planning for the Gifted, ed. Louis A. Fliegler (Englewood Cliffs, N.J., 1961) pp. 67,69.

DIVISION OF FRACTIONS

After the children have an understanding of the division of fractions the topic can be extended by exploring other ways of expressing the process, identifying the common elements in the different algorithms, evaluating the processes, explaining why "inverting the divisor and multiplying" is a short cut, and examining early algorithms.

The following procedure was used in this way.

PROPERTIES OF DIVISION

If $a \div b = c$, then $c \times b = a$ If $27 \div 3 = 9$, then $9 \times 3 = 27$

If the dividend and divisor are multiplied or divided by the same number, the dividend remains the same.

If $24 \div 6 = 4$, then

$$(24 \times 2) \div (6 \times 2) = 4$$
$$(24 \div 2) \div (6 \div 2) = 4$$

The quotient of any given number and 1 is the given number. (Identity element for division)

$$24 \div 1 = 24$$

The product of any number and its reciprocal is equal to one. (Inverse element for multiplication.)

$$4 \times \tfrac{1}{4} = 1$$

Two fractional numbers are reciprocals of each other if their product is 1.
The reciprocal of 2/3 is 3/2 because $2/3 \cdot 3/2 = 6/6 = 1$

Every fractional number except 0 has a reciprocal; every reciprocal is also a fractional number.

APPLYING THE PROPERTIES OF DIVISION TO THE NUMBERS OF ARITHMETIC

Another way to obtain a quotient

$$36 \div 9 = (36 \times \frac{1}{9}) \div (9 \times \frac{1}{9}) = (36 \times \frac{1}{9}) \div 1 = 36 \times \frac{1}{9} = 4$$

$$3 \div 4 = (3 \times \tfrac{1}{4}) \div (4 \times \tfrac{1}{4}) = (3 \times \tfrac{1}{4}) \div 1 = (3 \times \tfrac{1}{4}) = \frac{3}{4}$$

This agrees with the answer invented for $3 \div 4$

$$\frac{2}{3} \div \frac{3}{4} = (\frac{2}{3} \times \frac{4}{3}) \div (\frac{3}{4} \times \frac{4}{3}) = (\frac{2}{3} \times \frac{4}{3}) \div 1 = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$$

Check: $\frac{8}{9} \times \frac{3}{4} = \frac{24}{36} = \frac{2}{3}$

The three previous examples show why "inverting the divisor and multiplying" is correct.

We can now say: to divide $\frac{a}{b}$ by $\frac{c}{d}$, multiply $\frac{a}{b}$ by the reciprocal of $\frac{c}{d}$.

RESTATEMENT OF DIVISION PROPERTY 2

If both numerator and denominator of a fraction are multiplied or divided by the same number, the value of the fraction remains the same.

OTHER WAYS TO SHOW THE "WHY" OF DIVISION OF FRACTIONS

$$\frac{2}{3} \div \frac{3}{4} = \frac{\frac{2}{3}}{\frac{3}{4}} = \frac{\frac{2}{3} \times \frac{4}{3}}{\frac{3}{4} \times \frac{4}{3}} = \frac{\frac{2}{3} \times \frac{4}{3}}{1} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$$

$$\frac{2}{3} \div \frac{3}{4} = n$$

$$n \times \frac{3}{4} = \frac{2}{3}$$

$$(n \times \frac{3}{4}) \times \frac{4}{3} = \frac{2}{3} \times \frac{4}{3}$$

$$n \times (\frac{3}{4} \times \frac{4}{3}) = \frac{2}{3} \times \frac{4}{3}$$

$$n \times 1 = \frac{2}{3} \times \frac{4}{3}$$

$$n = \frac{2}{3} \times \frac{4}{3}$$

$$n = \frac{8}{9}$$

Common Denominator Procedures:

$$\frac{2}{3} \div \frac{3}{4} = \frac{8}{12} \div \frac{9}{12} = \frac{\frac{8}{9}}{1} = \frac{8}{9}$$

$$\frac{2}{3} \div \frac{3}{4} = \frac{\frac{2}{3}}{\frac{3}{4}} = \frac{\frac{2}{3} \times 12}{\frac{3}{4} \times 12} = \frac{8}{9}$$

$$\frac{2}{3} \div \frac{3}{4} = (12 \times \frac{2}{3}) \div (12 \times \frac{3}{4}) = 8 \div 9 = \frac{8}{9}$$

EARLY ALGORITHMS

The well-known method used for division of fractions, "inverting the divisor and multiplying," was known in the early Middle Ages by both the Hindus and the Arabs. It seems to have dropped out of sight for three or four hundred years, reappearing in various works in the 15th and 16th centuries. It was not generally accepted by 16th century writers, but in the 17th century it became quite common.

Early printed books gave two leading methods, the common denominator and the cross multiplication methods. The first method was done in much the same way as now. The second method involves the same operations that enter with the inverted divisor, the divisor usually placed on the left, but sometimes on the right.

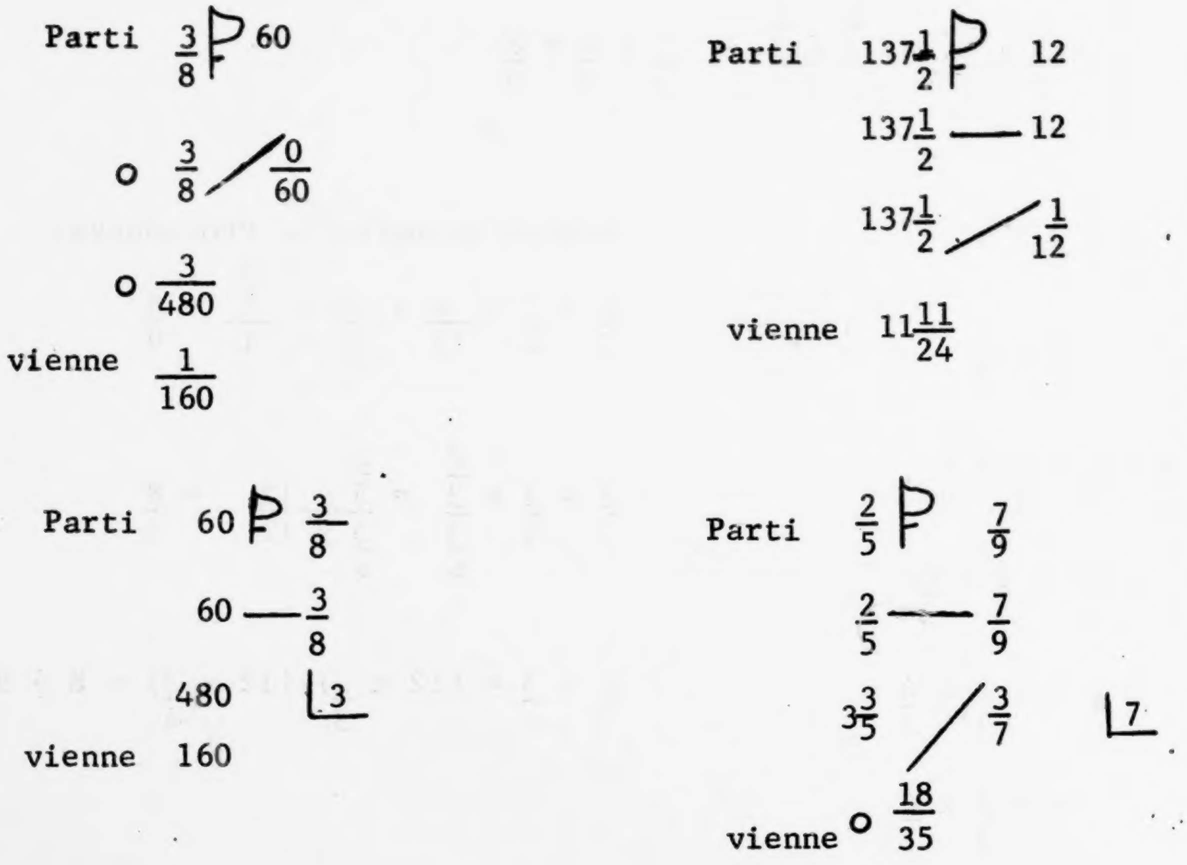
$\frac{2}{3}\times\frac{3}{4} = \frac{8}{9}$ Cross Multiplication

Shown here are some of the early methods with the author and time given.

Brahmagupta	c. 628	inverted divisor
Bhāskara	c. 1150	inverted divisor

Chuquet 1484 $\frac{2}{3} \div \frac{3}{4} = \frac{8}{12} \div \frac{9}{12} = \frac{8}{9}$

Calandri 1491



Parti
3/8
60
o
3/8
0/60
o
3/480
vienne
1/160
Parti
137 1/2
12
137 1/2
12
137 1/2
1/12
vienne
11 11/24
Parti
60
3/8
60
3/8
480
3
vienne
160
Parti
2/5
7/9
2/5
7/9
3 3/5
3/7
7
vienne
o
18/35

Frisius 1540 $\frac{3}{5} \div \frac{12}{13} = \frac{3}{5} \div \frac{4 \times 3}{13} = \frac{13}{4 \times 5} = \frac{13}{20}$

Recorde 1540 $\frac{2}{3}$ by $\frac{3}{4}$ $\frac{2}{3}$ is to $\frac{3}{4}$ as 8 is to 9

Italian (anonymous) 1545 $\frac{1}{8}\times\frac{5}{9}$ $\frac{40}{9}$ $4\frac{4}{9}$

	Step I	Step II	Step III
Wingate 1629	$7\frac{1}{2}\big)\ 42\ \big($	$\frac{15}{2}\big)\ \frac{42}{1}\ \big(\frac{84}{15}$	$15\big)\ 84\ \big(5\frac{3}{5}$

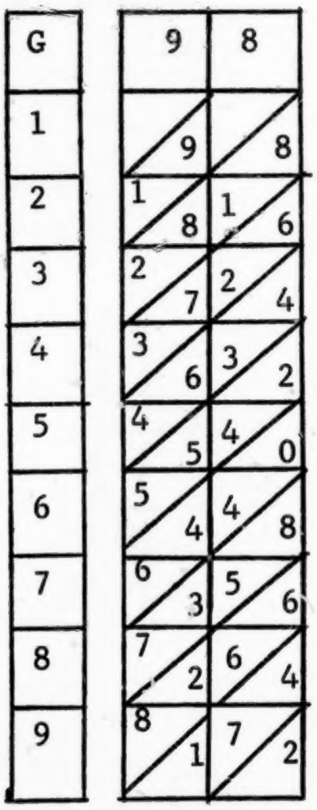
David Eugene Smith, Number Stories of Long Ago, (Washington, D.C., National Council of Teachers of Mathematics, 1958) p. 78.

David Eugene Smith, History of Mathematics, Vol. II, (New York, Dover Publications, Inc., 1953) pp. 226-228.

USING NAPIER'S RODS FOR LONG DIVISION

The class was introduced to the use of Napier's rods for multiplication. This question arose: How can the rods be used for division? One of the boys, Richard, grade 6, explained their use in this fashion:

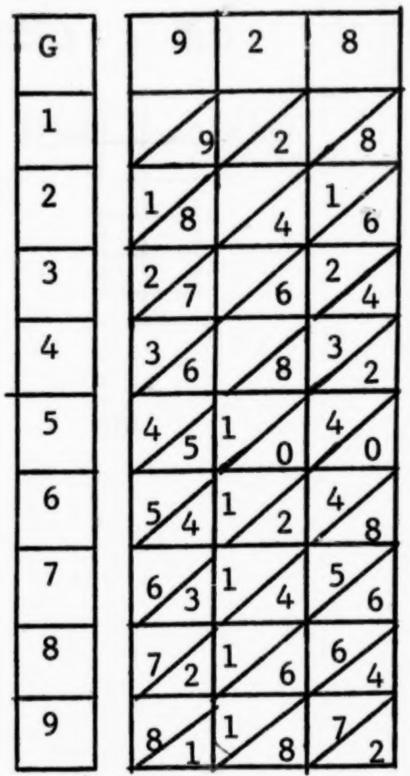
> Select strips to represent the divisor. Use the guide to locate the quotient figures. Find the exact number or the nearest one below that of the dividend. This number is your partial product. Proceed as usual, but each time taking the new dividend.


G
9 8
1 9 8
2 1/8 1/6
3 2/7 2/4
4 3/6 3/2
5 4/5 4/0
6 5/4 4/8
7 6/3 5/6
8 7/2 6/4
9 8/1 7/2

*1st product

**2nd product

```
       47
98 / 4673
   * 392
      753
   ** 686
       67
```


G
9 2 8
1 9 2 8
2 1/8 4 1/6
3 2/7 6 2/4
4 3/6 8 3/2
5 4/5 1/0 4/0
6 5/4 1/2 4/8
7 6/3 1/4 5/6
8 7/2 1/6 6/4
9 8/1 1/8 7/2

**2nd product

*1st product

```
          604
928 / 560825
    * 5568
        4025
    **  3712
         313
```

Note: When the new dividend is smaller than any of the partial products on the strips, a zero is placed in the quotient.

BRAINBUSTER

"Suppose you are given a certain number of points, with no more than two on a single line. Can you, with this information alone, predict how many lines there will be?"

This brainbuster was given at the end of the first lesson on non-metric geometry in the television series "Exploring Mathematics." In the following lesson a similar problem was given, one relating to points and planes. When problems evolve out of work being done in the class, it would seem that their value is enhanced. Some of the responses are given below:

Wilkins-Hathaway Method

"If you wanted to find out how many lines would dissect 25 dots, you add all of the numbers from 1-24 by the Gauss method. Twenty-five dots make 300 lines between two dots."

The Dot Table
1 - 0
2 - 1 + 2
3 - 3 + 3
4 - 6 + 4
5 - 10 + 5
6 - 15 + 6

Frank-Gardner Method

Subtract 1 from the number of points. Multiply the difference by the number of points. Divide the product by 2.

$$\frac{\boxed{}\left(\boxed{}-1\right)}{2}=\triangle \qquad \frac{\boxed{25}\left(\boxed{25}-1\right)}{2}=\triangle_{300}$$

n	l
1	0
2	1
3	3
4	6
5	10
6	15
.	.
.	.
.	.
25	300

Hulteng Method

Subtract 1 from the number of points. Divde the difference by 2. Multiply this result by the number of points.

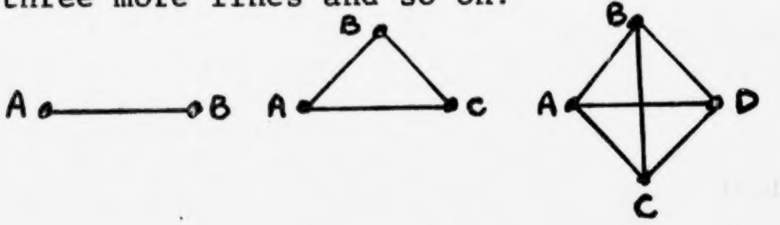
$$\frac{\boxed{}-1}{2}\cdot\boxed{}=\triangle$$

$$\frac{\boxed{25}-1}{2}\cdot\boxed{25}=\triangle_{300}$$

Points	Lines
2	1
3	3
4	6
5	10
.	.
.	.
.	.
25	300

Ellis Method

"Starting with two points, there is one line. Then with three points, it's two more lines. With four points, it's three more lines and so on."

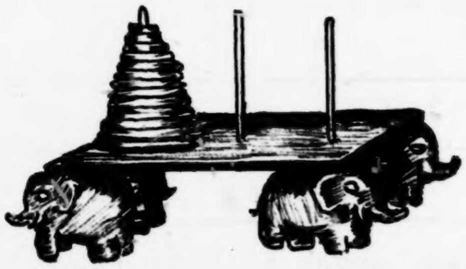


AB ↔   BC ↔   CD ↔
AC ↔   BD ↔
AD ↔

RECREATIONAL MATHEMATICS

On "Exploring Mathematics," a television series produced by Eugene Public Schools for sixth grade children advanced in mathematics, several important mathematical ideas are introduced through the use of puzzles and famous problems. Supplementary material is sent to the students to encourage a mathematical and an historical approach to recreational mathematics. The Tower of Hanoi, Magic Squares, Variations on a Famous Problem, and the Value of Proof, are examples of this material.

THE TOWER OF HANOI



The game known as the Tower of Hanoi was invented by a French mathematician, Edouard Lucas, in 1883. The game is very similar to that of the Chinese rings; in fact, the theory of the Chinese rings suggested the idea of this puzzle to the inventor.

Mr. Lucas tells an interesting legend of the origin of this puzzle.

"The Mandarin Claus (anagram for Lucas) from Siam says that during his travels in connection with the publication of the works of Fer-Tam-Tam (Fermat) he saw in the great temple at Benares, beneath the dome which marks the center of the world, a brass plate in which are fixed three diamond needles, each a cubit high and as thick as the body of a bee. On one of these needles God placed at the Creation sixty-four disks of pure gold, the largest disk resting on the brass plate, the others getting smaller and smaller up to the top. This is the Tower of Brahma. Day and night unceasingly, the priests transfer the disks from one diamond needle to another according to the fixed and immutable laws of Brahma, which require that the priests on duty must not move more than one disk at a time, and that no disk may be placed on a needle which already holds a smaller disk. When the sixty-four disks shall have been transferred from the needle on which at the Creation God placed them to one of the other needles, then towers, temple and priests alike will crumble into dust, and with a thunderclap the world will vanish.

If we suppose that the priests can make one transfer every second, with never a mistake, they must work for $2^{64} - 1 = 18,446,744,073,709,551,615$ seconds, or more than 500,000 million years.

We can rest easy. The end of the world will not come tomorrow."[1]

---

[1] Maurice Kraitchik, Mathematical Recreations (New York, Dover Publications, Inc., 1953) pp. 91-93.

Another version of this legend tells that in a temple in Mandalay there is an ebony altar which rests on the back of four elephants. From this alter rise three ruby needles, each twenty cubits high and the width of a lotus stem. The sixty-four disks are made of solid ivory.

How to play the game:

To begin the game, put all the disks on one post in order of size, with the largest one at the bottom. The problem is to move the entire tower of disks from one post to another, in the smallest possible number of moves. The rules of the game are simple: move only one disk at a time; never put a larger disk on the top of a smaller one. It helps to remember that every other move transfers the smallest disk from one post to another.

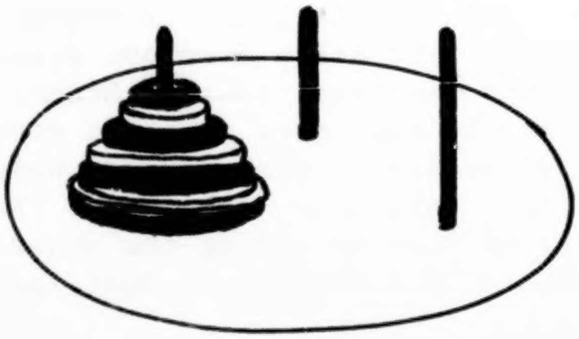
To make the game interesting mathematically, try to discover the least number of moves needed to shift all of the disks from one post to another. Record your findings as shown here:

Disks	1	2	3	4	5	6	7	8	9
Moves	1	3	7	15	31				

Can you predict how many moves it will take to move a tower of six disks? 7, 8 or 9 disks? Hint: Notice the pattern of numbers showing the number of moves - 1-3-7-15-31.

In the legend, the number of moves that the priests must make to move a tower of 64 disks is: $2^{64}-1$. If n stands for the number of disks, the least number of moves needed is $2^{n} - 1$. To move three disks, the least number of moves is $2^{3} -1 = 2 \times 2 \times 2 - 1 = 8 - 1 = 7$

Some people prefer to color the disks, using two colors alternately. Suppose you should use red and black. Rotate all red disks in a clockwise direction and all black disks in a counterclockwise direction. What is the result? Number the disks and notice what happens to the even disks, the odd disks.



If you enjoyed this puzzle, you will surely be interested in the puzzle of the Chinese rings. Directions for making it may be found in the "Magic House of Numbers" by Irving Adler.[1]

---

[1] Irving Adler, Magic House of Numbers (New York, The John Day Company, 1957) pp. 91-94.

MAGIC SQUARES

8	1	6
3	5	7
4	9	2

4	9	2
3	5	7
8	1	6

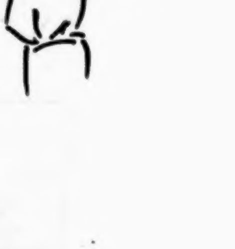
3	4	8
9	5	6
2	7	1

What is the magic in a magic square?
Is this a magic square?

Magic squares have fascinated people for more than 2,500 years. There really is no magic in the square but a square is said to be magical if the sum of the numbers is the same in each horizontal and vertical row, as well as in the two diagonals.

There are many, many different methods of forming magic squares, but the easiest ones to make are those with an odd number of cells on a side such as 3, 5, 7 or 9. The simplest one to make has 3 cells on a side, or 9 cells altogether. This may be called a 3-cell magic square or a three-by-three magic square.

In order to make a square with 9 cells, place a different number, from 1 to 9, in each cell so that the rows, columns, and diagonals will add up to the same sum. What is that sum?



What will be the sum of each row, column, and diagonal? You can use either of these two methods to find out:

General rule for odd and even cell squares which start with the number 1.

1. Cube the number of cells in a row.
2. Add the number of cells in a row to the result.
3. Divide the result by 2.
   3-cell magic square $3^3 + 3 = 30 \div 2 = 15$
   5-cell magic square $5^3 + 5 = 130 \div 2 = 65$
   6-cell magic square $6^3 + 6 = 222 \div 2 = 111$

Another method is to find the sum of all the numbers from 1 to 9. (45) Since there are three rows, divide 45 by 3 to find the sum of each row. Can you think of an easy way to find the sum of a series of numbers?

$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45 \div 3 = 15$

Now how do you go about placing a different number in each cell in such a way that every row, every column, and each of the two diagonals adds up alike?

Begin by placing the first number, 1, in the middle cell of the top row. Write all the other numbers diagonally moving from left to right. When a number is to be placed in a cell that lies outside the square, put that number in the bottom row of the column. When a number is to be placed in a cell that already is occupied, then place this number in a cell just below the last number. Figures A and B show the completed operation.

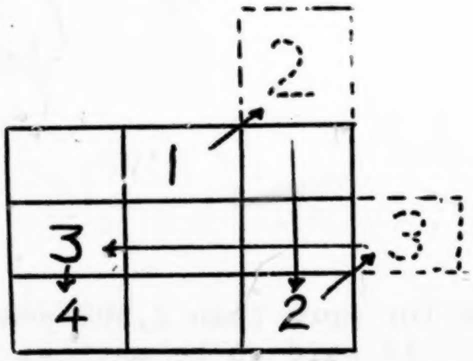


FIG. A

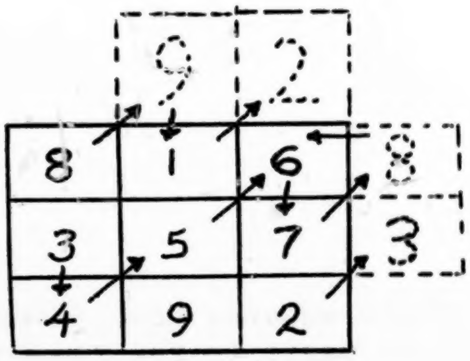
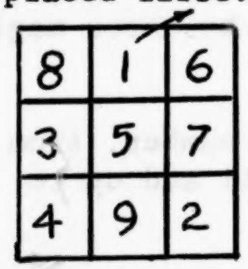
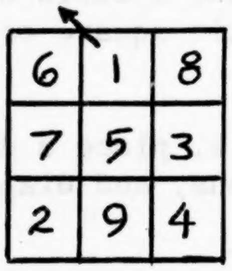


FIG. B

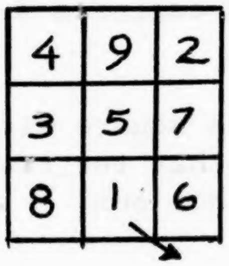
After you have practiced putting numbers in a 3-cell square, with the number 1 in the middle cell of the top row, try putting the number 1 in another position or reverse the diagonal movement of numbers. The arrows show the direction of the diagonal movement of numbers. For comparison Figure A is placed first.



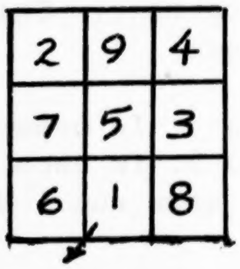
8	1	6
3	5	7
4	9	2



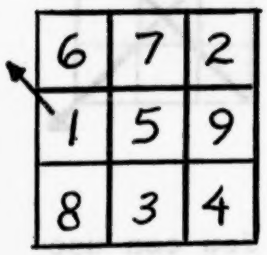
6	1	8
7	5	3
2	9	4



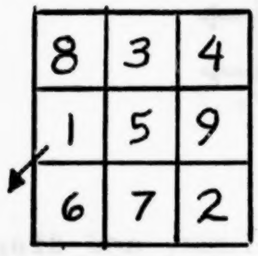
4	9	2
3	5	7
8	1	6



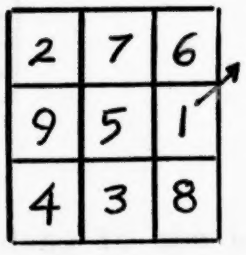
2	9	4
7	5	3
6	1	8



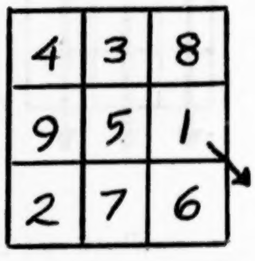
6	7	2
1	5	9
8	3	4



8	3	4
1	5	9
6	7	2



2	7	6
9	5	1
4	3	8



4	3	8
9	5	1
2	7	6

Notice that in each of the eight squares even numbers appear in the corner squares and odd numbers in the cross. The mean number will always occupy the center.

8		6
4		2

	1	
3	5	7
	9	

Below are some 3-cell magic squares beginning with numbers other than 1. What do you notice about the sums of the rows, the columns, and the diagonals? Notice what happens to the corner squares and the cross when you begin with an even number.

9	2	7
4	6	8
5	10	3

SUM ______

11	4	9
6	8	10
7	12	5

SUM ______

13	6	11
8	10	12
9	14	7

SUM ______

12	5	10
7	9	11
8	13	6

SUM ______

10	3	8
5	7	9
6	11	4

SUM ______

14	7	12
9	11	13
10	15	8

SUM ______

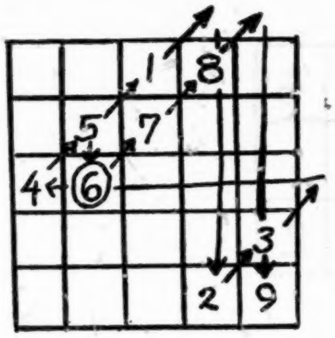
Square beginning with number 1	Sum of each row, column, and diagonal = 15
Square beginning with number 2	Sum = ?
	etc.

The sum of all the numbers in the 3-cell square beginning with 1 is 45 Complete the table below which shows numbers used in the squares beginning with 2, 3, 4, 5, 6, 7.

1 + 2 + ... + 9 = 45
2 + 3 + ... + 10 = ___
3 + 4 + ... + 11 = ___
4 + 5 + ... + 12 = ___
5 + 6 + ... + 13 = ___
6 + 7 + ... + 14 = ___
7 + 8 + ... + 15 = ___

What can you say about the sums?

After you have made 3-cell squares, now try to make a 5-cell square with the numbers from 1 to 25. Each row, column, and diagonal will add up to 65. Remember that the first number is in the center of the top row and the direction is right oblique. The same principle applies to the 5-cell square as it did to the 3-cell square. It is necessary to change the pattern when you identify the sixth cell. The numbers circled show the changes needed.



17	24	1	8	15
23	5	7	14	⑯
4	⑥	13	20	22
10	12	19	㉑	3
⑪	18	25	2	9

You can also construct other odd squares such as the 7 square and the 9 square.

An interesting method and a rather simple one is to transpose numbers outside the square to their places inside the square.[1] Begin by adding extra cells as shown in Figure A. Arrange the numbers in their natural order. Transpose the numbers to their places as shown by the arrow. (Figure B)

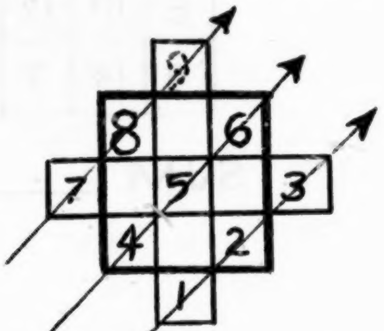


Figure A

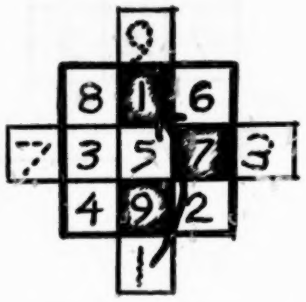


Figure B

8	1	6
3	5	7
4	9	2

You might like to try arranging the diagonals and number sequences in other ways. (See Figures A and B below) How many different ways are there? You might begin with a number other than 1. (Figure C)

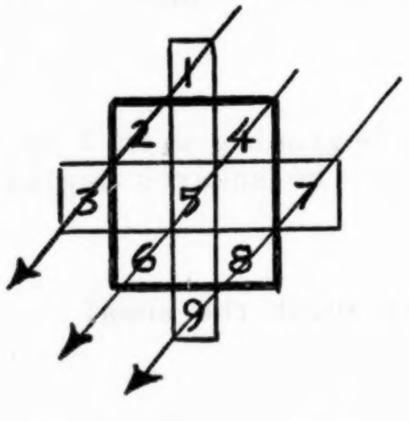


Figure A

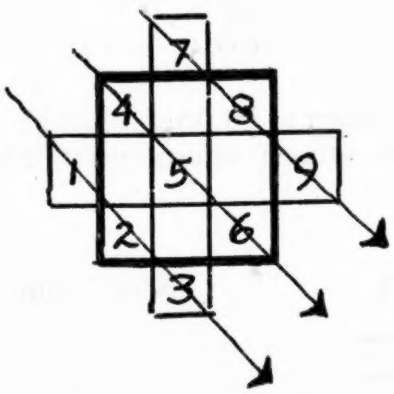


Figure B

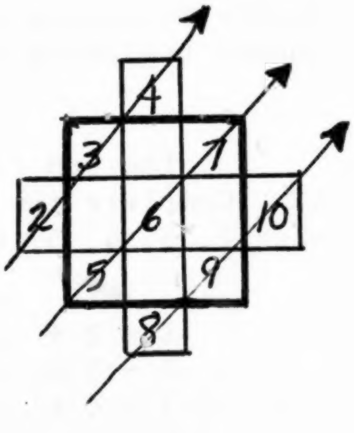


Figure C

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[1] Edward Falkener, Games Ancient and Oriental and How to Play Them, (New York, Dover Publications, Inc., 1961), pp. 272-273.

A square of five is done in the same manner, as shown in Figures A and B.

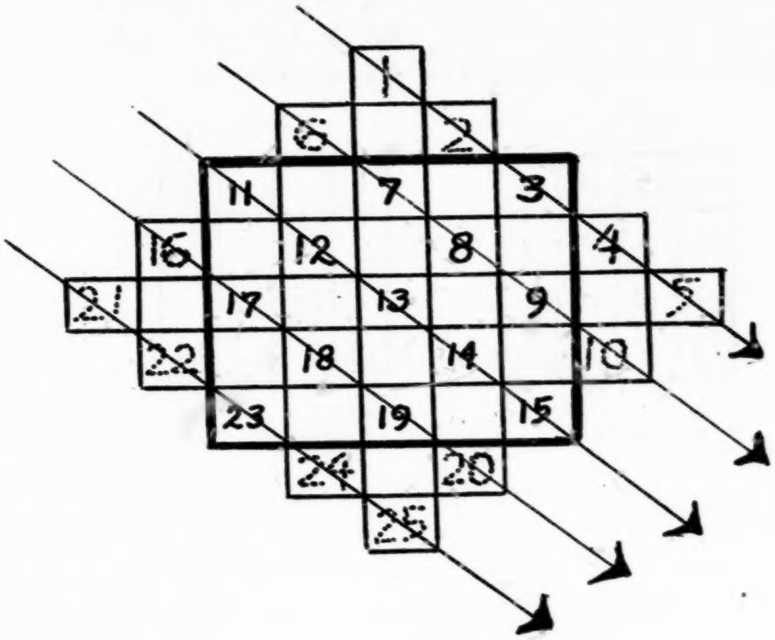

1
6
2
11
7
3
16
12
8
4
21
17
13
9
5
22
18
14
10
23
19
15
24
20
25

Figure A

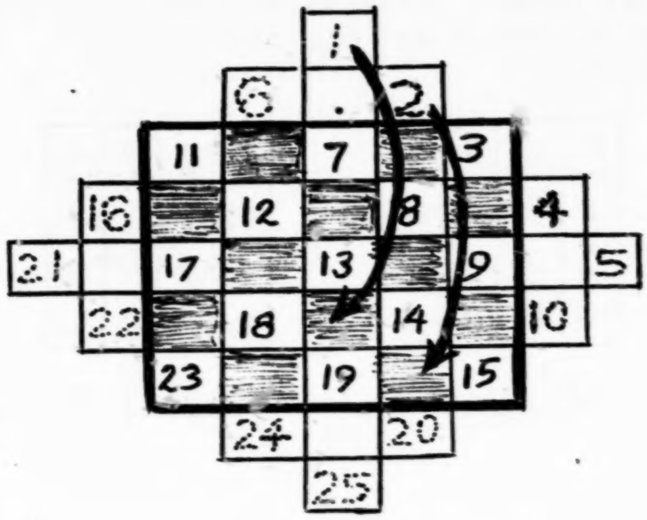
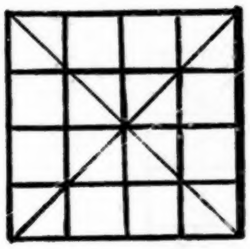

1
6
2
11
7
3
16
12
8
4
21
17
13
9
5
22
18
14
10
23
19
15
24
20
25

Figure B

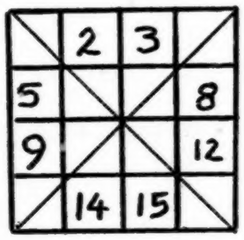
Even-Cell Magic Squares

Even-cell magic squares are formed differently from the odd-cell magic squares. To construct a 4-cell magic square:

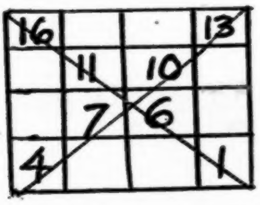
1. Draw two diagonals.



2. Beginning in the upper left-hand corner, and moving from left to right, number the squares from 1 to 16, omitting the numbers where there is a diagonal.


2
3
5
8
9
12
14
15

3. Beginning in the upper left-hand cell, start with the number 16, the last number in the consecutive numbers 1 to 16, and count backwards. Move from left to right as before putting numbers in only those cells crossed by the diagonals.


16
13
11
10
7
6
4
1

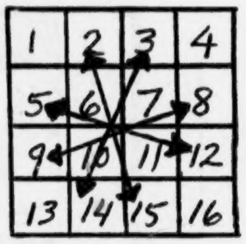
16	2	3	13
5	11	10	8
9	7	6	12
4	14	15	1

Another way to construct a 4 x 4 magic square:

Using the numbers 1 through 16, arrange them in the square in their natural order. (Figure A) Now interchange the 2 and 15, the 3 and 14, the 5 and 12, the 8 and 9. See Figure B. The completed square is shown in Figure C.[1]

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Figure A

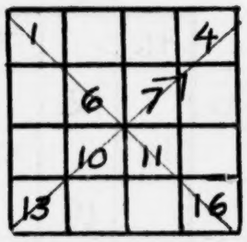


1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Figure B

1	15	14	4
12	6	7	9
8	10	11	5
13	3	2	16

Figure C



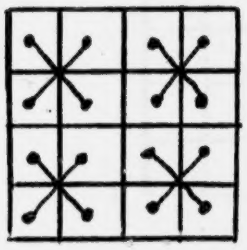
1			4
	6	7	
	10	11	
13			16

Figure D

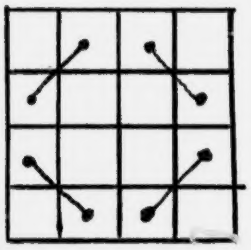
You will notice that the numbers on the two diagonals remain unchanged. We can now arrange a magic square in the same manner as was shown in steps 1-3 at the beginning of the section on even-cell squares.

Still another way to make a magic square of 16 cells is described in Magic Squares, Circles, Stars by Harold D. Larsen.[2]

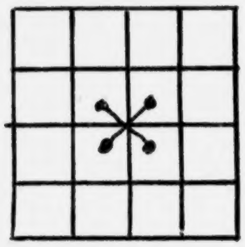
Using any one of these methods for making a 4 x 4 square, examine a completed square. What is the sum of each row, each column, and each diagonal? As you examine this square further you will notice some unusual things about it.



The four corner squares add up to 34.



The opposite short diagonals of two cells each add up to 34.



The four center squares add up to 34.

There are unlimited opportunities for discovery in the construction of magic squares. A 4 x 4 magic square can be formed by beginning with a number other than 1, using any series of 16 consecutive numbers. Here are sone interesting variations to explore:

---

[1] Edward Falkener, Games Ancient and Oriental and How to Play Them, (New York, Dover Publications, Inc., 1961), pp. 272-273.

[2] Harold D. Larsen, Magic Squares, Circles, Stars, Grade 5, (Evanston, Illinois, Row, Peterson and Company, 1956), p. 7.

Multiply each number in the square by the same number. What is the result?

Divide each number in the square by the same number. What is the result?

Using a calendar, select a 4 x 4 square. Now interchange the numerals according to the basic pattern. Does this make a magic square? For other activities with the calendar see Calendar Fun by Harold D. Larsen.[1]

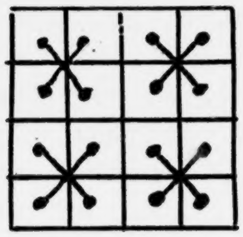
MARCH

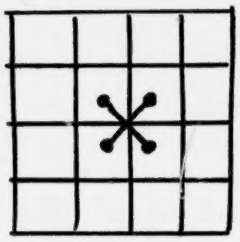
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

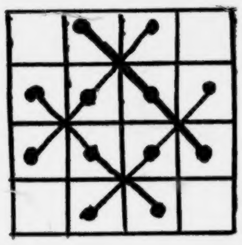
Early Variations

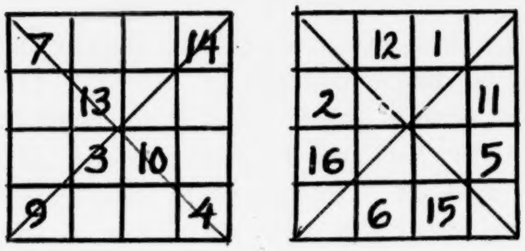
7	12	1	14
2	13	8	11
16	3	10	5
9	6	15	4

Perhaps one of the earliest variations of a magic square appears in an inscription found in the ruins of an ancient town in India. This magic square is probably not older than the 11th or 12th century. This 4-cell square has an even number of squares on a side and each of the four lesser squares are related to the others.[2]









The sum of the numbers in the diagonals equals the sum of the numbers not in the diagonals.

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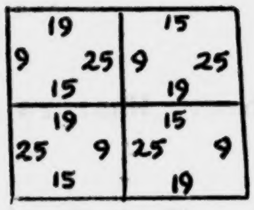
[1] Harold D. Larsen, Calendar Fun, Grade 8, (Evanston, Illinois, Row, Peterson and Company, 1960), pp. 4-5.

[2] D. E. Smith, History of Mathematics, Vol. II, (New York, Dover Publications, Inc., 1953), p. 594.

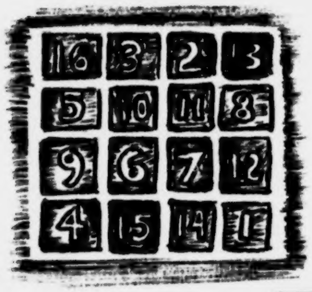


Add each upper and lower pair of numbers vertically or horizontally. Notice these patterns:

Horizontal:
9 25 9 25
25 9 25 9

Vertical:
19 15
15 19
19 15
15 19

The Melancholia Magic Square

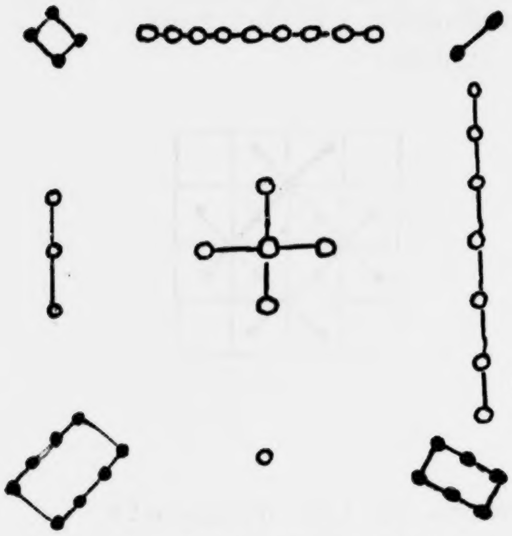


16	2	3	13
5	11	10	8
9	7	6	12
4	14	15	1

This magic square is shown in Albrecht Dürer's famous engraving known as "Melancholia" and is one of the first to appear in print. Dürer, in order to use the date of the painting (1514) in this square, interchanged the numbers 14 and 15 and also the two columns in which they stand.[1] Can you discover what effect the changing of the two columns would have? Notice the square before Dürer's change in the order of 14 and 15 and the two columns.

Lo Shu

The World's Oldest Magic Square
(From the *Yih King*, one of the oldest Chinese books.)



In Number Stories of Long Ago, David Eugene Smith tells this story of the Lo Shu:

> There is an ancient book, perhaps the oldest book in all the world, and the name of this is *Yih King* (ye king). It was written thousands of years ago and records one of the earliest of all the curious things connected with number, for it says that once upon a time there came out of the Yellow River a large turtle, and on its back were some strange marks which puzzled everyone who saw them.[2]

This story refers to the Lo Shu, probably the most ancient magic square. It is said to date back to the time of the Chinese Emperor Yü or Ta-Yü, that is Yü the Great, who reigned 2205 to 2198 B.C. The story goes that the Emperor stood, one day, on the banks of the Hoang Ho or the Yellow River gazing at its colored waters as they flowed beneath his feet; and lo, from their muddy depths there climbed out onto the bank a sacred tortoise bearing the strange device shown above. The numbers were figurate, that is, expressed by simple patterns of lines, dots, and circles. It will be noted that all the odd digits lie within the cross now recognized as that of St. George. In other words the cross was regarded as the emblem of deity. The Lo Shu thus acquired a deep mystic significance and is held in the highest veneration in the East. It provides protection against the Evil Eye; placed over the entrance to a dwelling nothing evil can enter. Every fortune-teller in the East uses it. As a charm it is found inscribed in fortune books, medicine cups, on amulets and the like. He who would enjoy good health and the good things of life bears the Lo Shu on his person.[1]

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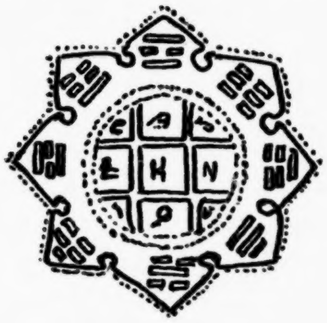
[1] Jerome S. Meyer, *Fun With Mathematics*, A Premier Book, (New York, Fawcett World Library, 1952), p. 47.

[2] D. E. Smith, *Number Stories of Long Ago*, (Washington, D.C., National Council of Teachers of Mathematics, 1958), pp. 96-97.

The black circles are used in representing even numbers, the white ones in representing odd numbers. If you change these to the usual magic square, you will have this three-cell square:

4	9	2
3	5	7
8	1	6

Thibetan "Wheel of Life"



In this Wheel of Life the center portion is a magic square and the outer circle is the Pa-kua. Not shown here, is still another outer circle which represents the signs of the zodiac. The Pa-kua had various virtues assigned to them and have been used from a very early period until the present for purposes of divination. The Yih King, also written as I-King, also states that the Pa-kua were footsteps of a dragon horse which appeared on a river bank in the reign of the Emperor Fuh-hi. The Pa-kua are found today on the compasses used by the diviners in every city and village of China. They are also found on fans, vases, and many other objects in the home, and on talismans of various kinds in common use in Thibet and other parts of the Far East.[2]

From China the magic square traveled to Japan. It found its way to India and neighboring southern countries and was probably carried by astrologers to the West. Both the Arabs and Hebrews used the magic square and textbook writers of medieval times used it in their works. One writer tells us that the first magic square in our notation is dated at least as early as 1000 B.C.

Textbook writers of the sixteenth century paid considerable attention to magic squares. Some of the people of that time believed that a magic square when inscribed on a silver plate or charm would protect its owner from the plague or from harm or would bring good fortune.

During the early colonial times in the United States, arithmetic books from Europe were in use and then at the beginning of the 18th century American editions of these books were printed. The most popular arithmetic book at the beginning of the Revolution was published in London and was reprinted here in 1769. In this book can be found the familiar 3-cell magic square as well as other well-known puzzles.

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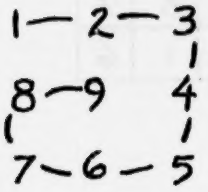
[1] J. Newton Friend Numbers: Fun and Facts, (New York, Charles Scribner's Sons, 1954), pp. 96-98.

[2] David Eugene Smith, History of Mathematics Vol. I, (New York, Dover Publications, Inc., 1951), pp. 25-29.

Today nearly every book on recreational mathematics has something on magic squares. Can you see why the magic square has such a long history? What is the magic in a magic square?

We have explored at some length the magic square. What would be an antimagic square? There are several hundred ways to construct such a square, one of which is shown in Scientific American, "Mathematical Games" by Martin Gardner, January, 1961, page 164.

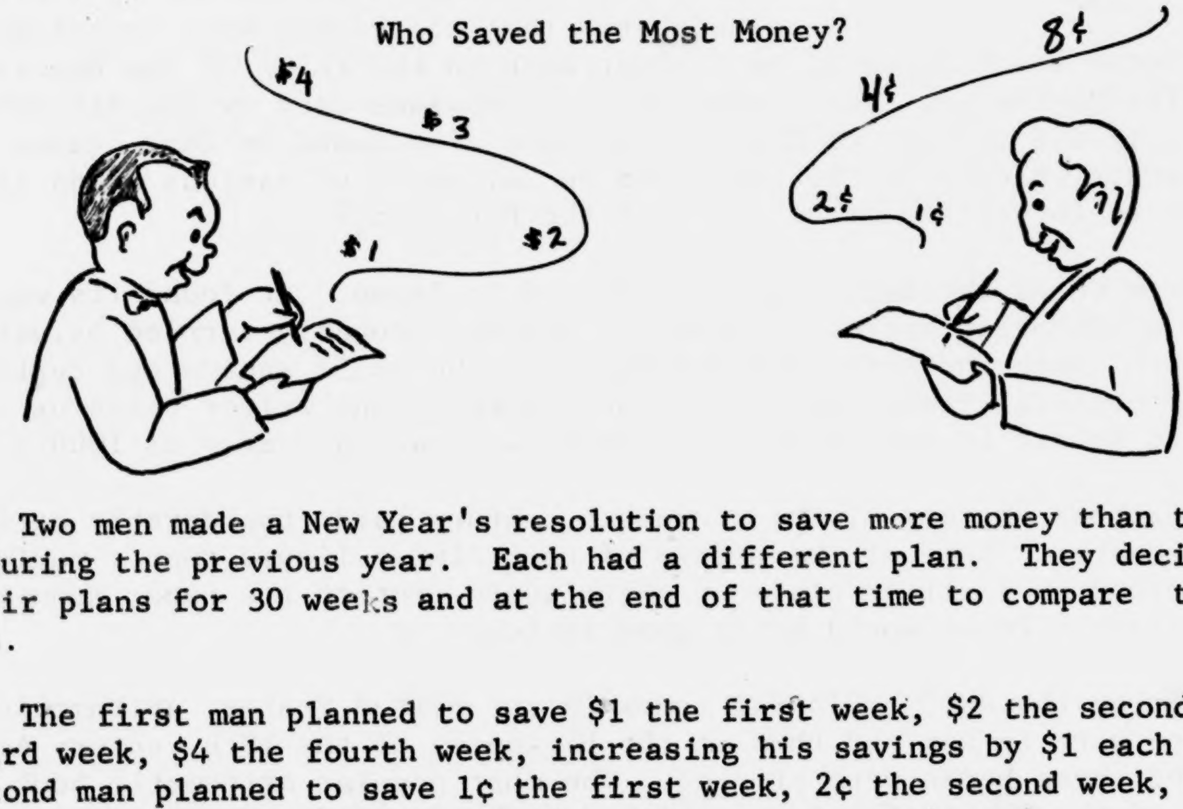
Antimagic Square



In this antimagic square each row, column, and main diagonal sums to a different total. A spiral of digits forms the magic square. There are several hundred ways to construct such a square. Can you find some other ways to form an antimagic square?

VARIATIONS ON A FAMOUS PROBLEM

Who Saved the Most Money?



Two men made a New Year's resolution to save more money than they had saved during the previous year. Each had a different plan. They decided to try their plans for 30 weeks and at the end of that time to compare their savings.

The first man planned to save $1 the first week, $2 the second week, $3 the third week, $4 the fourth week, increasing his savings by $1 each week. The second man planned to save 1¢ the first week, 2¢ the second week, 4¢ the third week, 8¢ the fourth week, doubling his savings each week.

Now, which savings plan will yield the most money?

I'LL SAVE THE MOST!
I'LL SAVE THE MOST!

We can calculate the total amount saved under each plan by writing down the amount saved each week and then by adding them up.

Plan I

Weeks	Amount each week	Total Amount
1	$1	$ 1
2	2	3
3	3	6
4	4	10
5	5	15
6	6	21
7	7	28
8	8	36
etc.		

Plan II

Weeks	Amount each week	Total Amount
1	$0.01	$0.01
2	0.02	0.03
3	0.04	0.07
4	0.08	0.15
5	0.16	0.31
6	0.32	0.63
7	0.64	1.27
8	1.28	2.55
etc.		

Solution to Plan I:
Total savings $465

Solution to Plan II:
Total savings $10,737,418.23

OTHER METHODS

A shorter way to get the answer in Plan I is to use Gauss' method for finding the sum of a series of numbers.

First: write the number series and then reverse their order.
$1 + $2 + $3 + $4 + . . . + $29 + $30
$30 + $29 + $28 + 27 + . . . + $2 + $1

Next: add each column. This will yield:
$31 + $31 + $31 + $31 . . . + $31 + $31
or thirty $31's
30 x $31 = $930

Finally: since each number was used twice, you must divide by 2.
30 x $31 = $930 ÷ 2 = $465 or $\frac{30 \times 31}{2}$ = $465

Still another short cut is the "middle number" method.
1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = ?

We find that the sum of the numbers is the product of the middle number (5) and the number of integers in the series, 5 x 9 = 45.

In this series the middle number (5) is the average of the individual members of the series. This may be expressed as follows:

(1+9) + (2+8) + (3+7) + (4+6) + 5 =
(5+5) + (5+5) + (5+5) + (5+5) + 5 =
9 x 5 = 45

For an even number of integers:
1 + 2 + 3 + 4 + 5 + 6 = ?
(1+6) + (2+5) + (3+4) =
(3 1/2) + (3 1/2) + (3 1/2) + (3 1/2) + (3 1/2) + (3 1/2) =
6 x 3 1/2 = 21

Now in the series 1 + 2 + 3 + 4 + . . . + 29 + 30, the "middle number" is halfway between 15 and 16, or 15 1/2. The product of 30 x 15 1/2 = 465 (Plan I)

Plan II may be expressed in this way:

The second week is 2; the third week if 2 x 2 or 2^2; the fourth week is 2 x 2 x 2 or 2^3; and so on, until the last week with 2^{29}.

A short way to find the total sum is to write down what the savings would be if it were doubled, and then take away the original series, $1 + 2 + 2^2 + 2^3 +$ etc.

Double $\quad 2 + 2^2 + 2^3 + 2^4 + \ldots \quad + 2^{28} + 2^{29} + 2^{30}$
Single $1 + 2 + 2^2 + 2^3 + 2^4 + \ldots \quad + 2^{28} + 2^{29}$

Notice that the difference is $2^{30} - 1$.
2^{30} is 1,073,741,824 so $2^{30} - 1$ is
1,073,741,823 cents or $10,737,418.23.

The Problem of the Horseshoe Nails

One of the best known arithmetic books of the 16th century, Recorde's "Ground of Artes," contains this problem of the horseshoe nails:

> "If I sold unto you a horse having four shoes, and in every shoe 6 nails, with this condition, that you shall pay for the first nail one ob, for the second nail two ob, for the third nail four ob, and so forth doubling untill the end of all the nails: Now I ask you how much would the price of the horse come unto?"[1]

This problem appears in several books of the 15th and 16th centuries, and even today many books on recreational mathematics show it in some form. The horseshoe problem is really a variation of a much older one, the Chessboard problem.

The Chessboard Problem

One of the most popular problems of the Middle Ages is the chessboard problem. A well-known Arab biographer (1256) says "That when Sissah ibn Dahir invented the game of Chess, the king, Shihram, was filled with joy and commanded that chessboards should be placed in the temples. Furthermore, he commanded Sissah to ask for any reward he pleased. Thereupon Sissah asked for one grain of wheat for the first square, two for the next, and so on in geometric progression." Smith remarks that no answer is given for this puzzle and goes on to say that an old German manuscript says, "No emperor could pay all that."[2] Do you agree?

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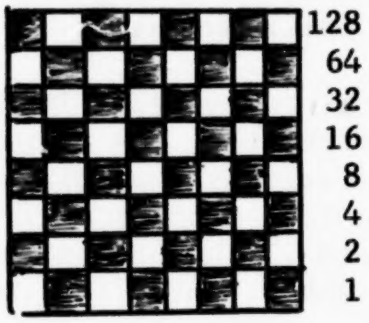
[1] Florence A. Yeldham, The Teaching of Arithmetic Through Four Hundred Years (London, George G. Harrap and Co.), p. 38.

[2] D.E. Smith, History of Mathematics Vol. II (New York, Dover Pub., Inc., 1953), pp. 549-550.

A chessboard has 64 squares. To find Sissah's reward, make a table showing the number of grains for each square.



Square	Grains
1	1
2	2
3	4
4	8
5	16
6	32
7	64
.	.
.	.
.	.
64	9,223,362,036,854,775,808

Solution: Find the sum of numbers in the second column.
Answer: 18,446,744,073,709,551,615

What is the total number of grains of wheat? How would you read this number?

We are told that this problem is oriental in its origin. A chessboard problem of a different type appeared in the writing of a Chinese Buddhist of the T'and Dynasty (620-907). The above problem goes back at least to the 10th century when it appeared in "Meadows of Gold," by Mas 'udi, a famous Arab geographer and historian who visited China in 915.

Other Arab writers included this problem in their books. From the Arabs it found its way into Europe during the 13th, 14th and 15th centuries with many extensions and changes such as the horseshoe problem.

The Famous Story of Gauss

Karl Friedrich Gauss (1777-1855) is spoken of as one of the three greatest mathematicians of all time. It was Gauss who called arithmetic the Queen of Mathematics.

From early childhood Karl was gifted in mathematics. There are several stories about his childhood, the first one concerning an incident before he was three years old.

One Saturday Gerhard Gauss was making out the weekly payroll for the laborers under his charge, unaware that his young son was following the proceedings with critical attention. Coming to the end of his long computations, Gerhard was startled to hear the little boy pipe up, "Father, the reckoning is wrong, it should be . . . " A check of the account showed that that the figure named by Gauss was correct.

Before this the boy had teased the pronunciations of the letters of the alphabet out of his parents and their friends and had taught himself to read. Nobody had shown him anything about arithmetic, although presumably he had picked up the meanings of the digits 1, 2, . . . along with the alphabet. In later life he loved to joke that he knew how to reckon before he could talk. A prodigious power for involved mental calculations remained with him all his life.

Shortly after his seventh birthday Gauss entered his first school, a squalid relic of the Middle Ages run by a virile brute, one Büttner, whose idea of teaching the hundred or so boys in his charge was to thrash them into such a state of terrified stupidity that they forgot their own names.

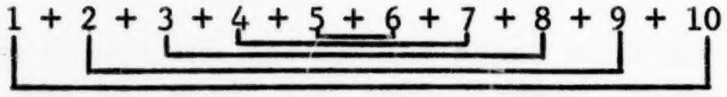
Nothing extraordinary happened during the first two years. Then, in his tenth year, Gauss was admitted to the class in arithmetic. As it was the beginning class none of the boys had ever heard of an arithmetical progression. It was easy then for the heroic Büttner to give out a long problem in addition whose answer he could find by a formula in a few seconds. The problem was of the following sort, 81297 + 81495 + 81693 + . . . + 100899, where the step from one number to the next is the same all along (here 198), and a given number of terms (here 100) are to be added.

It was the custom of the school for the boy who first got the answer to lay his slate on the table; the next laid his slate on top of the first, and so on. Büttner had barely finished stating the problem when Gauss flung his slate on the table: "There it lies," he said - "Liggert se' " in his peasant dialect. Then, for the ensuing hour, while the other boys toiled, he sat with his hands folded, favored now and then by a sarcastic glance from Büttner, who imagined the youngest pupil in the class was just another blockhead. At the end of the period Büttner looked over the slates. On Gauss' slate there appeared but a single number. To the end of his days Gauss loved to tell how the one number he had written was the correct answer and how all the others were wrong. Gauss had not been shown the trick for doing such problems rapidly. It is very ordinary once it is known, but for a boy of ten to find it instantaneously by himself is not so ordinary.

This opened the door through which Gauss passed on to immortality. Büttner was so astonished at what the boy of ten had done without instruction that he promptly redeemed himself and to at least one of his pupils became a humane teacher. Out of his own pocket he paid for the best textbook on arithmetic obtainable and presented it to Gauss. The boy flashed through the book. "He is beyond me," Büttner said; "I can teach him nothing more."[1]

You will find other versions of this story concerning the sum of a series. Usually the examples are much simpler than the one given above, to find the sum of 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 or to find the sum of the first hundred whole numbers.

This diagram shows the method used:



One and 10 make eleven, 2 and 9 are again 11, etc. THere are 5 similar pairs so 5 times 11 makes 55. The number of pairs is one-half of all the numbers or one-half of the last number.

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[1] E.T. Bell, Men of Mathematics (New York, Simon and Schuster, 1937), pp. 221-222.

See what you can do with these series:

1 + 2 + 3 + 4 . . . + 60 + 61
7 + 9 + 11 + 13 + 15 + 17 + 19
19 + 20 + 21 + 22 + 23 + 24 + 25
94 + 95 + 96 . . . 100 + 101 + 102
1 + 5 + 9 + 13 + 17 + 21
1 + 2 + 4 + 8 + 16 + 32
5 + 10 + 15 + 20 + 25 + 30
1 . 2 . 4 . 8 . 16 . 32
1 + 2 + 3 + 7 + 8 + 9

$$\frac{173 + 174 + 175 + 176 + 177}{5} = ?$$

$$\frac{275 + 275 + 275 + 275 + 275}{5} = ?$$

THE VALUE OF PROOF

Here is a story which is an amusing example of the misuse of fundamental operations. I like to tell this story in conjunction with a discussion of the "value of proof "

"Figures don't lie - or do they?"

Sam was delivering coal and was told to collect the bill for 7 tons of coal at $13 a ton Sam didn't know how to find the total amount of the bill so he asked his friend, Jake.

Jake said, "Multiply 13 by 7 "

Sam said, "How?"

Jake said, "This way: 7 times 3 is 21; 7 times 1 is 7; 21 and 7 are 28. The bill is $28."

$$\begin{array}{r} 13 \\ \underline{x7} \\ 21 \\ \underline{7} \\ 28 \end{array}$$

"I don't think that is enough," insisted Sam.

"Well," Jake said, "if you want to be sure, write down 13 seven times and then add."

"How?" queried Sam.

"This way: 3, 6, 9, 12, 15, 18, 21, 22, 23, 24, 25, 26 27, 28. The bill is $28."

$$\begin{array}{r} 13 \\ 13 \\ 13 \\ 13 \\ 13 \\ 13 \\ \underline{13} \\ 28 \end{array}$$

"I don't think that is right," Sam persisted.

"Why not divide 28 by 7 and see if the answer is 13?" Jake then suggested.

"How?" again asked Sam.

"This way: 7 into 2 will not go; 7 into 8, once; into 21, three times. The bill is $28."

$$\begin{array}{r} 13 \\ 7\overline{)28} \\ \underline{7} \\ 21 \\ \underline{21} \end{array}$$

Our class enjoyed the story of Sam and Jake, but it was pointed out that subtraction had not been used as one of the ways in solving the problem. One of the boys found a way to use subtraction. Here is the way he told it:

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[1] Herbert F. Spitzer, Practical Classroom Procedures for Enriching Arithmetic, (St. Louis, Webster Pub. Co., 1956) pp. 159-160.

"First, you subtract the three and then the one. If you do that seven times there is nothing left over, so I'm sure you fellows are right," said the satisfied customer.

$$\begin{array}{l}
28 \\
\left.\begin{array}{r}\underline{-3}\\25\\\underline{-1}\\24\end{array}\right\}1 \\
\left.\begin{array}{r}\underline{-3}\\21\\\underline{-1}\\20\end{array}\right\}2 \\
\left.\begin{array}{r}\underline{-3}\\17\\\underline{-1}\\16\end{array}\right\}3 \\
\left.\begin{array}{r}\underline{-3}\\13\\\underline{-1}\\12\end{array}\right\}4 \\
\left.\begin{array}{r}\underline{-3}\\9\\\underline{-1}\\8\end{array}\right\}5 \\
\left.\begin{array}{r}\underline{-3}\\5\\\underline{-1}\\4\end{array}\right\}6 \\
\left.\begin{array}{r}\underline{-3}\\1\\\underline{-1}\\0\end{array}\right\}7
\end{array}$$

MATHEMATICS TELEVISION SERIES - "EXPLORING MATHEMATICS"

An in-school television program, "Exploring Mathematics," is offered for the advanced students in the sixth grade. This series begins in January and concludes at the end of the school year, with forty lessons in the entire series.

Although the two half-hour programs each week are designed as direct teaching, it is desirable for the teacher in charge of the group to do some follow-up work related to the lessons and to assist in assignments that may be made on the television program.

CRITERIA FOR SELECTION OF CHILDREN TO PARTICIPATE

Since this program is designed for more able children who will take mathematics I and II (Parts 2, 3, 4) in their seventh grade year it is necessary to use some care in selecting the children to participate in this program. The following criteria should be used:

The child's reading achievement should be approximately one year in advance of his grade level.

His mathematical achievement should be approximately one year in advance of his grade level. The achievement may be determined by the Stanford Achievement Test scores from the fifth grade year.

The opinion of the teacher concerning the child's ability as well as his drive should be taken into consideration.

CLASS ORGANIZATION TO PROVIDE FOR PARTICIPATION

Various arrangements may be made for these children to observe the television lessons. It may be desirable to have the resource teacher working at this time with the advanced group in a separate room. However, this plan may not seem necessary. Arrangements may also be made in the classroom for two groups in much the same way that arrangements are made for two groups in reading; one group working near the television set, the other group having assigned work in another part of the room. In some instances the resource teacher takes the regular class so that the classroom teacher may work with the television group.

On the other three days of the week children should be involved in doing their work from their regular mathematics books, either in a separate group or with the remainder of the class, depending on the organization of the particular class.

MATERIALS TO BE USED

There is no television manual used with the mathematics series. The text is Introduction to Secondary School Mathematics, Volume I, Part I, School Mathematics Study Group.

USE OF STUDENTS IN THE TELEVISION SERIES

Six students from the advanced group appear each week as the studio class. A school supplies students for one month.

Studio children are used as a visual aid and to help pace the speed of the lesson. The teacher provides opportunities for the classroom students to participate by allowing them time for thinking, raising hands to answer questions, writing and working out problems. Teaching mainly to the studio children is avoided so that the program becomes a participation lesson rather than a demonstration lesson.

SOURCES OF ENRICHMENT MATERIAL

Some teachers prepare and use a collection of challenging problems in their teaching of mathematics. Although there are some excellent collections and there are many sources for finding one or more problems, the practice of keeping a file or notebook of problems that show special merit seems to be a practical one. Notations on their use, variants of the same problem, extended applications, and possible solutions increases the value of such a practice.

In addition to the sources given here, the bibliography at the end of this section of the handbook will offer further possibilities.

> Children's textbooks often provide extended topics in starred sections or exercises or in a section at the end of the book.
>
> Teacher's guides or manuals include many suggestions for enrichment activities and experiences. Many of these are extended topics which build upon mathematical ideas of the regular program.

Some children's books that present quantitative ideas or that have a unique appeal because of their relationshionship to mathematical topics will be of interest to those who already have a high degree of interest in mathematics. Representative of the first type is Magic House of Numbers by Irving Adler, and of the second type, Carry On, Mr. Bowditch by Jean Lee Latham.

Some professional books on mathematics instruction are an excellent source of enrichment topics, with suggestions for their use. Understanding Arithmetic by Robert L. Swain, Arithmetic - Its Structure and Concepts by Francis J. Mueller, The Growth of Mathematical Ideas, Grades K-12 and Instruction in Arithmetic by the National Council of Teachers of Mathematics are examples of this source.

Courses of study for the gifted developed by school districts, statewide, and national groups will have a section on mathematics with specific suggestions.

Professional books on the gifted and on the subjects of creativity and the psychology of learning may have sections on mathematics. In the order mentioned are such books as Curriculum Planning for the Gifted by Louis A. Fliegler, ed., Creativity in Teaching by Alice Miel, ed., and Productive Thinking by Max Wertheimer and The Child's Conception of Geometry by Jean Piaget.

Very useful are books on the history of mathematics such as The Wonderful World of Mathematics by Lancelot Hogben, An Introduction to the History of Mathematics, by Howard Eves, The History of Mathematics Part I and Part II, and Number Stories of Long Ago by David Eugene Smith.

Enrichment books and booklets provide a ready source of material written at the child's level. Such series as the Enrichment Program for Arithmetic by Harold D. Larson (Grades 3-8), Exploring Mathematics On Your Own by William H. Glenn and Donovan A. Johnson (12 pamphlets), the Ginn Arithmetic Enrichment Program (Grades 4-8), Herbert F. Spitzer's Practical Classroom Procedures for Enriching Arithmetic, and Mathematics Enrichment Program (A, B, C, D) by George Spooner, are typical of this type of material. The last one mentioned is programmed instruction.

Materials developed in connection with recent experimental mathematics programs can be used as another approach to conventional topics or as additional topics. Materials developed by the Newton, Massachusetts schools for advanced pupils in grades 4, 5 and 6; School Mathematics Study Group texts for grades 4 through 7; Science Research Associates publications of the Greater Cleveland Mathematics Program (K-6) Newton Hawley and Patrick Suppes' Geometry for Primary Grades as well as Suppes' texts for primary grades, Sets and Numbers; and the Wirtz-Botel-Sawyer Math Workshop for Children, designed for use in grades 1 through 6; all of these represent the newer programs.

Materials in books on recreational mathematics can be used if care is taken to modify or adapt them so that mathematical thinking is the prime purpose for their use. The emphasis placed upon the mathematical basis of a trick of puzzle determines its usefulness as enrichment. Some good sources are: Mathematical Recreations by Maurice Kraitchik, Amusements in Mathematics by H. E. Dudeney, and Fun With Mathematics by Jerome S. Meyer.

Other sources are special monographs, articles in professional journals, and sections of magazines. Publishers of textbooks on mathematics prepare monographs on topics of interest to the teacher. Journals such as "The Arithmetic Teacher" and the "Mathematics Teacher" offer an abundant supply of ideas and helps. In fact, these two journals offer the most detailed descriptions of materials and techniques that can be found. "The Scientific American" has a section on recreational mathematics, most of which is too advanced for the elementary grades.

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History of the calendar. World calendar reform.

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The basic how's and why's of our number system are made interesting through mathematical curiosities, riddles, tricks, and games. Some of these are: casting out nines, number bases (8, 12, 2) personalities of numbers, finger multiplication, multiplication by doubling, Towers of Hanoi, Chinese Rings, and Nim. Grades 6-8.

* ________, Mathematics, Exploring the World of Numbers and Space, New York, Golden Press, 1960.
Words and pictures explain the fundamental ideas of arithmetic, algebra, geometry, trigonometry, and calculus, as well as mathematics in nature and art. Plus mathematical tricks and games.

* ________, Mathematics: The Story of Numbers, Symbols, and Space, New York, Golden Press, 1958.
Presents mathematics in an interesting and different way through pictures, puzzles, exercises, and simple applications of things we know. Intermediate.

* ________, Time In Your Life, New York, John Day Co., 1955.
Man's reliance upon the sun, moon, and stars as indicators of time: early and modern timepieces; the history of the calendar; time zones; and other inportant influences of time in our lives are considered. Grades 5-8.

* Archer, Allene, Number Principles and Patterns, Boston, Ginn and Co., 1961.
Enrichment material for grades 7-8. May be used for advanced 6th.

* Asimov, Isaac, Realm of Numbers, Boston, Houghton Mifflin Co., 1959.
Presents the theory of numbers in a lucid and entertaining manner. Contains shape of numbers, very large and very small numbers, bases other than ten (7, 12, 2), exponents, and logarithms among other topics.

* Ball, W. W. Rouse, A Short Account of the History of Mathematics, New York, Dover Pub. Inc., 1960.
An historical summary of the development of mathematics, illustrated by the lives and discoveries of those to whom the progress of the science is mainly due.

* Bendick, Jeanne, How Much and How Many, New York, McGraw-Hill Book Co., 1960.
The story of weights and measures; a fascinating history of the use of various weighing and measuring devices. It is an excellent source book. Grades 5-8.

* Bentley, W.H.E., and E.W. Maynard Potts, *Geometry, Part I: Discovery by Drawing and Measurement*, N.Y., Ginn and Co., 1937.

The first three sections of Part I are concerned with the fundamental ideas of solid, surface, line, point, direction, and angle. In the remainder of Part I, many facts of geometry are discovered by drawing and measuring.

Brandes, Louis Grant, *A Collection of Cross-Number Puzzles*, Pupil and Teacher's Editions, Portland, Maine, J. Weston Walch Co., 1957.

Contains hundreds of intriguing puzzles in arithmetic.

* ________, *Math Can Be Fun*, Pupil and Teacher ed., Portland, Maine, J. Weston Walch Co., 1956.

* Brindze, Ruth, *The Story of Our Calendar*, N.Y., The Vanguard Press, Press, 1949.

Information is given about the different types of calendars developed through the ages; the use made of the sun, moon, and stars in keeping time records; the international date line, latitude and longitude; and Greenwich time. Grades 4-8.

* Calandra, Alexander, *Symbols*, St. Louis, Missouri, Washington University, 1960.

This pamphlet contains an elementary discussion of the origin and development of mathematical symbols.

* Campbell, Elizabeth A., *Nails to Nickels*, Boston, Little, Brown and Co., 1960.

The Story of American coins old and new. Grades 2-4.

* Cutler, Ann, and Rudolph McShane, *The Trachtenberg Speed System of Basic Math*, N.Y., Doubleday and Co., Inc., 1960.

The Trachtenberg method of high-speed arithmetical calculations employs methods radically different from the conventional methods.

* Davis, Philip J., *The Lore of Large Numbers*, N.Y., Random House, Inc., 1961.

This is one of a series of monographs in the new mathematical library, written for high school students and teachers. The trade edition of these monographs is handled by Random House, Inc., while the distribution of these monographs to high schools has been taken over by L. W. Singer Co. Inc. This series is a project of the School Mathematics Study Group.

* Dudeney, H. E., *Amusements in Mathematics*, N.Y., Dover Pub. Inc., 1958.

Paperback

* Freeman, Mae, and Ira Freeman, Fun With Astronomy, N.Y., Random House, Inc., 1953.

Ideas of measurement of time and distance are applied in this source book about the universe. Many simple experiments are suggested. Grades 4-8.

* ________, *Fun With Figures*, N.Y., Random House, Inc., 1946.

Fun with geometric figures and other geometric concepts results from following the suggested experiments with straight line figures, curves, and solids. Grades 5-8.

* Freitag, Herta Taussig, and Arthur H. Freitag, The Number Story, Washington, D.C., National Council of Teachers of Mathematics, 1960.

Growth of number notions; recording of numbers, non-positional and positional systems; methods of computation, both historical considerations and computation today; our numbers today, real, complex, and hyper-complex numbers. Advanced.

Friend, J. Newton, Numbers: Fun and Facts, New York, Charles Scribner's Sons, 1954.

Shows how interesting is the study of numbers, their origin, and peculiarities, and of the traditions, legends and superstitions that have, in the course of ages collected around them.

Highland, Esther Harris and Harold Joseph Highland, The How and Why Wonder Book of Mathematics, New York, Wonder Books, 1961.

Gives an over-all view of what mathematics is, how it developed historically and some of the ways in which various branches of mathematics are used. Paperback.

* Hogben, Lancelot, The Wonderful World of Mathematics, New York, Doubleday and Co. Inc., 1955.

The growth and development of mathematics through the ages are described in story and pictures. This history of mathematics shows how its development parallels the growth of civilization. Begins with the primitive counting methods of the earliest men; covers the development of geometry and algebra; concludes with a discussion of the modern achievement of mathematics and engineering. Advanced.

* Johnson, Donovan A., and William H. Glenn, Exploring Mathematics on Your Own, St. Louis, Misouri, Webster Pub. Co., 1960.

Series of twelve pamphlets that can be used as enrichment materials for those students whose interests and abilities reach beyond the typical topics and activities of the classroom. Generally, these pamphlets are not beyond the level of reading and vocabulary difficulty appropriate for those students in grades 6-8 who will be motivated to study them.

Sets, Sentences, and Operations
The Pythagorean Theorem
Topology - The Rubber - Sheet Geometry
Understanding Numeration Systems
Fun With Mathematics
Number Patterns
Invitation to Mathematics
The World of Statistics
Short Cuts in Computing
The World of Measurement
Adventures in Graphing
Computing Devices

* Kraitchik, Maurice, Mathematical Recreation, New York, Dover Publication Inc., 1953.

This book is filled with enrichment material on such topics as magic squares, ancient and curious problems, numerical pastimes, geometric recreations, permutational problems. Paperback. Grades 7-8.

* Larsen, Harold D., Enrichment Program for Arithmetic, Evanston, Illinois, Row, Peterson and Co., 1956.
A set of eight pamphlets for each grade. The pamphlets contain a variety of stories of both historical and recreational value. Grades 3-8.

* Latham, Jean Lee, Carry On, Mr. Bowditch, Boston, Mass. Houghton Mifflin Co., 1955.
Nathaniel Bowditch, apprentice to a ship's chandler in Salem in 1790, had only his own curiosity to encourage him to learn his "figures," but before he was 21 he knew more than most ships' captains and his tables for navigators have been guiding ships ever since. The story illustrates the importance and excitement of learning mathematics. Grades 6-8.

________, Trail Blazer of the Seas, Boston, Mass. Houghton Mifflin Co., 1956.
The achievements of Matthew Fontaine Maury, the father of oceanography, are the result of his constant search for knowledge about the motion of the oceans. His problem-solving methods are worth study. Grades 6-8.

* Marks, John L, and others, Ginn Arithmetic Enrichment Program, New York, Ginn and Co., 1961.
Three write-in texts for grades 4-6 are Exploring Mathematical Ideas, Enlarging Mathematical Ideas, and Extending Mathematical Ideas. Teachers' editions are available for each grade level.

McCloskey, Robert, Time of Wonder, New York, The Viking Press, Inc., 1957.
A description of the change of seasons on an island in Penobscot Bay makes wide use of the vocabulary of measurement and comparison. Grades 4-6.

* Meyer, Jerome S., Fun With Mathematics, Premier Books, New York, Fawcett World Library, 1952. Paperback.

* Newton Public Schools, Arithmetic Units for Pupils Talented in Arithmetic, Newton, Mass, Newton Public Schools, 1960.
Teachers' guide includes: Introduction: The Academically Talented Child, and eight units designed for grades 4, 5, 6. Each of these units is bound separately for the use of children. The teachers' guide gives the following for each unit: directions introductory story, teaching aids, appreciations and list of concepts, understandings, bibliography, page references for teachers, test answer sheet, answer to guide sheets, answers and background information for suggested activities.
Children's Texts:
Historical Development, of the Number System -5
Laws of Numbers and Fundamental Processes 4-6
Number Expressions, an Introduction to Equations and Variables -4
Other Scales of Notation 5-6
An Introduction to Sets -5
Measuring Distance Through the Ages -4

A Look at Measurement -6
Prime Numbers and Factoring -6 (Programmed Text)

* Rosen, Sidney, *Galileo and the Magic Numbers*, Boston, Mass., Little, Brown and Co., 1958.

  The life of the great mathematican and scientist shows how the question "why?" can produce important results. A description of Galileo's accomplishments and of his problem-solving approach will prove profitable to the reader. This biography tells of his struggle to gain acceptance of observational and research methods. Grades 7-8.

* Ruchlis, Hy, and Jack Englehart, *The Story of Mathematics*, New York, Harper and Bros., 1958.

  Begins by showing the reader how mathematics appears in art, microscopic life, shells, the stars, and industry; then teaches how to construct planes and geometrical figures; and concludes with a series of problems designed to link geometry with algebra and arithmetic. Advanced.

* Smith, David Eugene, *History of Mathematics*, Vols. I, II, Boston, Mass., Ginn and Co., 1925.

  This encyclopedia-type reference book is excellent for superior students and for teachers. Grades 7-8. Available in paperback edition.

* ________, Jekuthiel Ginsberg, *Numbers and Numerals*, Washington, D.C., National Council of Teachers of Mathematics, 1958.

  How our number system came into use, how some of the numerals came to have their present shape, how different number scales were used, how numbers were named, and interesting sections on "Mysteries of Numbers," and "Number Pleasantries" are included in this book. Grades 5-8.

* ________, *Number Stories of Long Ago*, Washington, D.C., National Council of Teachers of Mathematics, 1958.

  A famous historian relates the history of number, counting, and computing. He also includes some oddities and puzzles.

* ________, *The Wonderful Wonders of One-Two-Three*, New York, Scripta Mathematica, 1937.

  A short history of our number symbols, number names, and the early use of numbers and a few number puzzles and oddities are contained in this book. Grades 4-6.

Smith, George O., *Mathematics: The Language of Science*, New York, G. P. Putnam's Sons, 1961.

A historical treatment of the development of systems of numeration with special emphasis upon the evolution of number names and number symbols as means of communication.

* Spooner, George, *Mathematics Enrichment* (Program A, B and C) New York, Harcourt, Brace and World, Inc., 1962.

Each book develops three programmed topics. The topics are Sets, Geometry, and Numeration. Programs A, B, and C are intended to supplement 4th, 5th, and 6th grade textbooks. Book D, organized in traditional chapters to enrich the learning of grade 7, has topics that are suitable for advanced 6th grade pupils.

* Strader, William, W., Five Little Stories, Washington, D.C., National Council of Teachers of Mathematics, 1960.

This series of five essays discusses calendar revision, multiplication by use of Napier's Bones, the use of the symbol x for a number, a number large beyond normal comprehension, and the cycles of digits in the decimal expansion of the reciprocals of 7 and 17. Historical background and bibliographies are included and enrichment activities are suggested. Grades 7-8.

* Tannenbaum, Beulah and Myra Stillman, Understanding Maps, New York, McGraw-Hill Book Co. Inc., 1957.

The problems of mapping the land, sea, and sky are discussed, and ideas of scale drawing, comparison, and measurement are applied. Grades 5-8.

* ________, Understanding Time, New York, McGraw-Hill Book Co., 1958.

As the subtitle, "The Science of Clock and Calendars," indicates, this book explains the telling and recording of time and its historic highlights. Different types of clocks; the standardization of time; the establishment of time zones; and an introduction to the theory of relativity. Grades 7-8.

* ________, Vergara, William C., Mathematics in Everyday Things, New York, Harper and Bros., 1958.

How simple mathematical concepts provide the answers to hundreds of puzzling questions. Why is the day divided into twenty-four hours? Are parallel lines really parallel? How can shadows be used to measure an object's height? The answers to these and hundreds of other questions are given here clearly and accurately.

* Watson, Jane Werner, The World of Science, New York, Simon and Schuster, Inc., 1958.

The author describes scientists at work and includes a chapter on mathematics. This section discusses in an elementary way the language of science, computing without numbers, computers, and statistics. Grades 7-8.

* Zarchy, Harry, Wheel of Time, New York, The Thomas Y. Crowell Co., 1957.

This book is designed to make the reader aware of the concept of time, its importance in our lives, and devices man has invented to measure it. Amusing clocks and time-keeping devices are described. Time is explained in its many aspects and shown to be closely related to motion.

Science Units

Several science units are available upon request. These units were worked out by resource teachers as they worked with advanced pupils in workshop classes. Generally these units include a working outline, suggested activities, and a bibliography.

Archaeology of the United States

The Atom

The Cell

Chemistry

Geology of Oregon

Geology of the United States

Microscopy

Prehistoric Animals

The Rise of Civilization

Library Instruction

ELEMENTARY SCHOOL LIBRARY INSTRUCTION

With the new dimensions in education the centralized library has become an essential part of every school program. It is only recently that the importance of the library to the school program has been fully recognized. New techniques in teaching and new curriculum standards have made it imperative that the library and the librarian be equipped to meet the needs of the school. However, if the library contains the finest materials, the best collection of books, and offers the best kind of service but goes unused because the students do not know how to use it independently, the library has not fulfilled its purpose.

Because the resource teacher is involved in so many ways with the library and its use, some suggestions and guide lines have been included here for easy reference. It is hoped that these materials will help to:

acquaint the entire school staff with the over-all picture of library skills.

serve as a guide for teaching library skills in grades 1-6

suggest simple procedures and activities for teaching library skills at all grade levels

enable the student to enrich his learning through independent use of the library

give the student a continuing library experience that will make him self-sufficient in using the library and in furthering self-education

Resource teachers use a variety of ways to help students and classroom teachers toward an effective library program:

train student assistants in a variety of library techniques

organize and train volunteer library aides

stimulate interest in the library

provide and organize materials to enrich the school curriculum

cooperate with teachers in introducing, expanding, and reviewing library skills

cooperate in planning units

become familiar with other resources

encourage and assist children doing research or working on a project

develop an appreciation of and enjoyment of fine literature

Suggested Sequence of Library Skills

Introduction of Skills	Skills
Advanced	Newspapers, making a summary, study-type reading, learning to skim, making a bibliography, using special reference books as needed: biographical dictionaries, thesaurus, poetry index, books of quotations, use and maintenance of vertical file and picture file, abridged readers' guide to periodical literature, gazeteers.
Grade 6	Almanacs Biographical dictionaries (Introduction) Gazeteers (Introduction) Cross reference
Grade 5	Making a bibliography (Simple form) Unabridged dictionary (Introduction) Atlases Card catalog Taking notes and outlining Vertical file (Introduction) Poetry indexes
Grade 4	Cross reference (Introduction) Dewey decimal classification Card catalog (Introduction) Encyclopedias Dictionary (Abridged) Parts of a book Maps and globes Taking notes and outlining (Simple form)
Grade 3	Arrangement of books in library Alphabetical order Parts of the book (Introduction) Abridged dictionary (Introduction) Community libraries Encyclopedia (Introduction)
Grades 1-2	Citizenship in the library Checking books in and out Care of books Selecting suitable books Location of books (Easy) Parts of book (Incidental) Dictionary (Primary) Alphabetical order (Introduction)

Levels are suggested levels; the sequence is rather important but the level may be adjusted to student abilities. Skills are retaught and reviewed as necessary.

DEWEY DECIMAL SYSTEM

One of the greatest contributions to library service is the Dewey Decimal System devised by Melvil Dewey in the latter part of the 19th century. Mr. Dewey, a librarian himself, knew that there was a need for some system whereby printed materials could be categorized by subject matter, to facilitate finding the material. So he decided to divide the entire world of knowledge into ten groups, numbered from 001 through 999. The job he proposed to tackle was no simple one; and, like all interesting endeavors, a rather unique story of his thinking processes in developing this system, has been handed down by word of mouth.

At the onset, apparently, he reasoned that even if he covered every conceivable field of knowledge in his number system, there might still be those miscellaneous items left over, for which he would have no numbers. Therefore, he started his number system with 100. What books should be place in the 100's? The brain of man is his greatest endowment; without thought, man is non-existent. Therefore, books written on philosophy, psychology, behavior, etc. go into this numerical group: 100 - 199.

But man cannot rely solely on himself for guidance and help; and after all, he was endowed with this mind by a Divine Being. Therefore, books on religion would go into the group, 200 - 299. (The Bible is 221).

After man acquired his religion, it was necessary for him to learn to live with his fellow man. Then books written on sociology (transportation, military life, community helpers, costumes, folk tales, United Nations) appear in the group 300 - 399. It is well to remember at this point that in Melvil Dewey's day there was no United Nations. But he provided a space in his number system for organization devoted to the promotion of peace among nations.

Then, he reasoned, as long as people know they must get along with one another, they must have a way to communicate. Hence, philology or language took its' place next in the 400 - 499 group. This is where you would ordinarily find the dictionary, 423.

Now that people can communicate, he said, they can exchange ideas and experiment with the natural things around them - the stars, the earth, the animals and birds, numbers, plants, etc. Yes, this 500 to 599 category is a most important one because it represents the world of science. The interesting part about Mr. Dewey's numbers, though, is that as man learns more about a subject, the number for that subject can be expanded almost indefinitely. For example, 520 is the number for astronomy, 523 is the solar system, 523.7 is the sun, 523.72 is solar energy. As we discover more about solar energy, the number will be further expanded.

Well, after man discovered the never ending wonders of science, his next step was to apply what he learned. Hence, we have books on useful arts, electricity, machinery, carpentry, medicine, in the 600 to 699 group.

It goes without saying that all work and no play makes Jack a dull lad, indeed. And so, 700 to 799 are books in the arts, music, painting, games, riddles, the circus, and the fair, to mention a few pastimes.

Probably Mr. Dewey figured that man considered himself so smart by this time that he decided to write about himself and the world. He wrote poetry, plays, short stories, and other types of literature. They were placed in the 800 to 899 group. Poetry is given the number 811. If the poet is French, the number is 841, if he is Spanish, it is 851, if he is German, 831. The middle digit indicates the country.

The last group of numbers, 900 to 999 are given to books on history and biography. And rightly so; for after man accomplished all these things, he wanted to record them for posterity. These numbers, like the others, can be expanded almost indefinitely. Just as 8_3_1 indicates a book of poetry written by a German, 94_3_ is the history of Germany, 943.7 designates some city in Germany, etc.

You recall that Dewey left one block of numbers for anything he may have omitted. That group is the 000 - 099 group. Encyclopedia are in this group; so is journalism; and so is the study of library science.

Melvil Dewey was a smart man - an inventor who gave us a way of finding the right book in a short time in a library of any size. By merely looking into the card catalog if we want a book on how to feed a pet cat, we open the drawer marked C, flip the cards to CATS and find that several books in the library with the Dewey number 636, are books about cats. Since the books are placed on the shelves in consecutive numerical order, we can easily follow the numbers along until we reach the 600's.

NOTE: This version of the story of Dewey's decimal system was prepared by Helen Tyler, library consultant for Eugene Public Schools.

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